EXECUTIVE SUMMARY

BACKGROUND

Introduction

Within the Jacksonville Aviation System, Herlong Airport (HEG) caters to recreational general aviation (GA) operations and is promoted as "Jacksonville's premier general aviation recreational and sport flying airport". The airport is a prime recreational site for small private planes, hot air balloons, skydiving, gliders and other small or experimental aircraft. HEG supports the Jacksonville Aviation System by accommodating sport aeronautical operations, thereby serving as a reliever airport to Jacksonville International Airport.

In 2006, the Jacksonville Aviation Authority (JAA) undertook an update to the Herlong Master Plan. One of the primary reasons for the update is based upon the Federal Aviation Administration requirements associated with airports receiving development grants to conduct periodic updates to their airport development plans. In addition, Duval County is experiencing a tremendous increase in residential relocation that has resulted in an increase in construction of residential and commercial developments around the airport.

Goals and Issues

The goal of the master plan update is to define current and future aviation demand at HEG, the means and alternatives for addressing this demand, the role of the airport in the local, regional and national aviation system, and the need for and financial feasibility of new infrastructure and airport facilities. The primary objective of the master plan update is to create a 20-year development program that will maintain a safe, efficient, economical, and environmentally acceptable airport facility for the JAA, City of Jacksonville, and Duval County.

A Technical Advisory Committee (TAC), consisting of community leaders, aviation users and members of JAA Staff, was formed to gain input into the role of the airport as well as long-term demand. The TAC studied some of the following items:

- Future activity, including aircraft fleet mix and its impact on facilities.
- Development options at HEG to meet long-range needs (20+ years).
- Integration of a turf runway and runway length analysis to accommodate existing and future demand.
- Options for revenue diversification including aviation and non-aviation development; and

- Development of the airport so that it continues to be compatible with surrounding airspace and land use.

Three TAC meetings were held, and public input was achieved through an Open House and the Southwest Citizens Planning Advisory Committee (CPAC). Input from the Public and TAC contributed to the development of the final master plan recommendations.

Based upon these meetings, the following suggestions were made to JAA:

- Future development should be based upon aviation and non-aviation demand;
- An extension of Runway 7-25 is needed to serve General Aviation (GA) and small business jets;
- A turf runway, parallel to Runway 7-25, should be constructed to accommodate existing sport and experimental aircraft operations;
- Airport land use planning should be coordinated with the City of Jacksonville; and,
- On-airport development should consider both aviation and non-aviation development.

Factors Influencing the Master Plan

While a variety of factors impact the aviation industry as a whole, this Master Plan Update evaluated several local and national trends which may influence future activity at HEG including:

- The impacts of September 11, 2001;
- Fuel prices and regional aviation activity;
- Anticipated changes in GA fleet mix, including the introduction of new technology; and,
- Socioeconomic conditions in the region and their influence on the level of airport operations.

EXISTING FACILITIES

The collection and study of information relating to HEG and the surrounding community provided the basis for the study's development. An inventory of existing conditions was collected to provide insight into how changes, at both the airport and in the surrounding region, impact the type and level of aviation services provided. Facility information from each of the airport's functional areas, airfield and landside, was compiled to prepare a realistic long-term development plan.

Airfield Area

The airport has two active runways:

- Runway 7-25: the primary runway, which is 4,000 ft x 100 ft
- Runway 11-29: the secondary runway, which is 3,501 ft x 100 ft

Both Runways 7-25 and 11-29 are designated to accommodate aircraft meeting ARC B-II design criteria. Moreover, the same Runway Safety Area (RSA) and Object Free Area (OFA) standards are applicable to both runways. Issues associated with the runway environment at HEG include operational limitations by jet aircraft and the unauthorized use of the turf between Taxiway A and

Runway 7-25 for light aircraft operations. These activities initiated both a runway length analysis and turf runway evaluation.

The runway system at HEG is supported by Taxiways A through E which provide access to the general aviation areas, fixed based operator (FBO) facilities, and various hangar facilities. HEG is also equipped with two closed runways, which are used for limited aviation (i.e. access to existing hangars) and non-aviation activities (i.e. motorcycle training).

Landside Area

The FBO terminal facility at HEG is located on the north side of the airfield. The Jacksonville Aviation Authority serves as the airport's FBO and provides terminal, hangar space, aircraft parking tie-down areas, and fueling facilities. Currently, a total of 111 public auto parking spaces are available for visitors and tenants.

Several types of hangar facilities exist at the airport, including t-hangars, conventional hangars, and bulk hangar space. In addition to hangar space, JAA also provides land leases to private business owners. Aircraft storage and lease revenue in conjunction with fuel sales are currently the primary sources of operating revenues at HEG.

The terminal area aircraft parking apron encompasses approximately 32,100 square yards, which is divided into the East and West aprons as well as apron adjacent to the terminal for transient parking. Both the East and West aprons can collectively accommodate 95 aircraft and also provide direct access to adjacent hangar facilities. The transient aircraft parking apron can accommodate up to six (6) aircraft simultaneously.

Surface access to the airport is provided by the Herlong Airport Entrance Road which connects to Normandy Boulevard, an arterial highway that connects to Interstate I-295.

AVIATION FORECASTS

Historic Demand

The historical number of based aircraft and aircraft operations not only demonstrates the impact HEG has on the Jacksonville market, but it also provides the foundation for aviation activity forecasts. **Table 1** shows historic based aircraft and aircraft operations between 1995 and 2005.

TABLE 1 HISTORICAL AVIATION DEMAND		
Year	**Based Aircraft**	**Aircraft Operations**
1995	101	67,000
1996	101	80,100
1997	129	82,839
1998	118	66,726
1999	126	65,000
2000	142	72,200
2001	143	65,000
2002	162	80,700
2003	162	87,700
2004	162	87,870
2005	170	65,341
AAGR	**4.42%**	**0.12%**
Source: Herlong Airport Management Records, 2006		

Since HEG does not have an air traffic control tower on site, the consultant used fuel flowage information, aircraft operation counts obtained from the FBO staff, Jacksonville ARTCC data as well as a sample week of operations during the historic peak month, to obtain the historic annual operations for 2005. The discrepancy between the base year 2005 annual operations and previous years may be attributed to the cost of operating an aircraft, i.e. maintenance, fuel, storage, etc., as well as the long-term impacts of new security procedures resulting from the September 11 Terrorist Attacks.

Aviation Demand Forecast

This element of the Master Plan Update used updated projections of aviation activity as a basis for future facility planning at HEG. This analysis drew upon the most current industry information as well as information provided by the FAA, Florida Department of Transportation and Florida Aviation System Plan to define future levels of activity at HEG. Further, applying local socioeconomic and demographic factors to the projections of activity as well as the limitations imposed by available land development and funding provided realistic planning level projections for the following types of activity:

- Operations and Operational Fleet Mix
- Based Aircraft and Based Aircraft Fleet Mix
- Local and Itinerant Operations
- Military Operations

- Instrument Operations
- Peak Activity

These findings were presented to JAA, the TAC, and the CPAC for their consideration and comment. Further, after considering the impacts of 9/11, Very Light Jet (VLJ) aircraft, and the airport's role within the Jacksonville Aviation System, a preferred forecast of activity was formulated. Based upon this input, anticipated projections of activity were provided through 2025.

TABLE 2
SUMMARY OF ACTIVITY FORECASTS

	2005	2010	2015	2020	2025
Total Operations	65,341	68,748	72,605	76,686	81,002
General Aviation					
Itinerant	28,340	31,238	33,043	34,953	36,973
Local	34,761	35,510	37,562	39,733	42,029
Military	2,240	2,000	2,000	2,000	2,000
Instrument	3,267	3,437	3,630	3,834	4,050
Peak Hour	9	10	10	11	12
Based Aircraft	170	179	190	205	224

Source: The LPA Group Incorporated, 2006

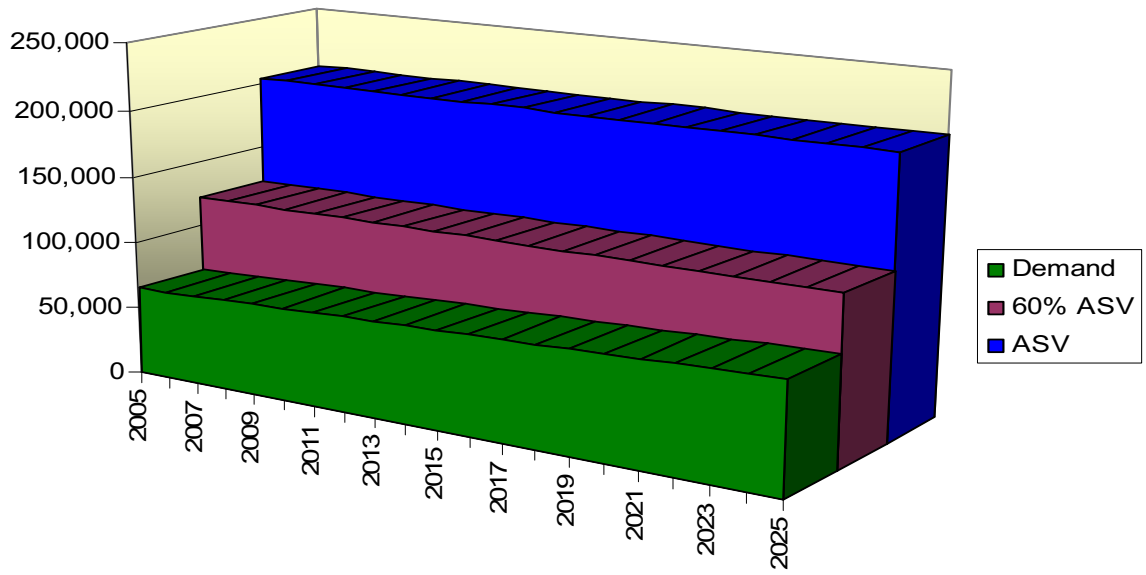
AIRPORT CAPACITY AND FACILITY REQUIREMENTS

Demand/Capacity Analysis

The demand/capacity analysis examined the capability of HEG's airfield system to fully support existing activity. It also determined the airfield's ability to meet future demand without causing significant or unacceptable delay or a decrease in the quality of service offered at the airport.

While elements of the FAA's traditional method for assessing airfield capacity were used in this analysis, JAA also considered the cost of capacity improvements versus the expected benefit from imposing alternative courses of action. Thus, the Annual Service Volume (ASV) at HEG was determined to provide a means of estimating the operational limitations of the airfield with increased levels of activity as shown in **Figure 1**.

Figure 1
Airfield Capacity



Source: The LPA Group, Inc. 2006

Capacity planning guidelines suggest that planning for additional capacity should occur when activity levels reach 60 percent of the airfield's annual service volume. Throughout the planning period, HEG's airfield capacity is expected to be well below these thresholds.

Facility Requirements

The Master Plan Update evaluated all facilities at HEG, including runway length, general aviation ramps, hangars, the roadway access system, automobile parking, airfield facilities, and support facilities to determine improvements necessary to accommodate existing and anticipated demand.

Key improvements included:

- the need to address turf runway demand;
- the need to extend the primary runway;
- the need to provide additional aircraft storage facilities;
- the need to relocate the airport access road and automobile parking;
- the need to rehabilitate the closed runways as taxiways; and
- the need to provide alternative land areas for commercial aviation and non-aviation development.

The study also considered other facility needs at HEG including airfield lighting improvements, support facilities, and documentation that should be developed in accordance with FDOT and FAA requirements. **Table 3** summarizes facility requirements by operational area.

TABLE 3
SUMMARY OF FACILITY REQUIREMENTS

Runways and Taxiways	▪ Conduct routine pavement maintenance on all runways and taxiways. ▪ Add signage at intersection of 11-29 and closed runways to limit runway incursions as well as add signage adjacent to Taxiway A and Runway 7-25 in conjunction with airfield improvements, such as distance-to-go and additional taxiway exit signs. Also, replace any old or damaged signs as part of signage program. ▪ Extend Runway 7-25 to accommodate anticipated demand. ▪ Extend Taxiway A to provide full-parallel to Runway 7-25 and additional MITL. ▪ Refurbish Crosswind Runway 11-29 ▪ Resurface and remark closed runways as taxiways ▪ Install MITL on closed runways. ▪ Construct new turf runway to support light aircraft movements. ▪ Rehabilitate pavement on Taxiways C and D.
General Aviation	▪ Construct at least 27 T-hangar units ▪ Construct 6 Corporate Hangars ▪ Construct 8 Conventional Hangars ▪ Construct at least 24,442 SY of additional aircraft storage apron
Airport Support Facilities	▪ Relocate electrical vault. ▪ Upgrade security fencing, and incorporate FDOT Security Requirements. ▪ Relocated/reconfigure automobile parking spaces adjacent to Airport Entrance Road. ▪ Close underground fuel tanks and replace with 12,000 gallon above ground fuel tanks.
Documentation	▪ Develop Pavement Condition Report ▪ Develop Airport Signage Plan ▪ Update GA Airport Security and Contingency Plan per FDOT/FAA Requirements.

Airfield Improvements

Based on determinations of facility needs, an alternatives analysis was conducted to visualize the development of needed improvements. These findings were presented to the CPAC and the general public through an open house for further input and discussion. Each of the alternatives presented was reviewed based on the following parameters:

- Safety and reliability;
- Cost;
- Compatibility with JAA system role expectations;
- Constructability;
- Environmental impacts;
- Land-use compatibility;
- Noise; and,
- Operational impacts.

Input from the CPAC and the general public contributed to the refinement of the alternatives analysis. Thus, the preferred development concept incorporates not only anticipated demand but also considered the surrounding environment and goals of the community.

The Herlong Technical Advisory Committee identified the necessity to provide a usable runway length of at least 4,500 feet and the construction of a parallel turf runway. This development requires the following:

- Extend Runway 7-25 1,000 feet including stopways to accommodate turbine and light jet aircraft;
- Construct parallel turf runway to Runway 7-25 to serve sport and glider air traffic;
- Rehabilitate closed runways as taxiways; and
- Implement precision approach to Runways 25 and 7

Associated with the proposed improvements include the extension of parallel Taxiway A, the construction of Taxiway E, airport signage and lighting improvements, pavement rehabilitation, apron expansion and construction as well as surface access improvements. This alternative resulted in the least impact to the surrounding areas, avoids any serious environmental impacts, and effectively utilizes existing airport property while accommodating aviation demand.

General Aviation/Airport Support Facilities

The preferred development concept for the North GA area addresses the need to provide variable hangar space to accommodate the changing fleet mix expected at HEG over the planning horizon. This concept also resolves the problem associated with public parking and airport access by realigning automobile parking spaces and relocating the airport entrance road from Normandy Boulevard.

The airport's goal of diversifying revenue streams is also addressed in the preferred concept with the provision to develop an industrial park on the south side and a commerce park on the east side of the airfield. This proposal also satisfies the airport's goal of creating suitable land use adjacencies and compatibility between aviation and non-aviation development as well as providing a buffer between aviation operations and residential development.

Enhancement to airport support facilities are directly related to other airport improvements. As a result, the following facilities will be relocated and/or replaced:

- Underground fuel tanks – replace and relocate above-ground.
- AWOS – replace existing equipment with updated AWOS-3, and
- Electrical vault – relocate to midfield, just east of Taxiway C, adjacent to AWOS.

Figure 2 below depicts the preferred overall development concept for HEG.

IMPLEMENTATION PLAN AND CIP

Based upon anticipated demand and associated facility needs at HEG, an implementation plan was developed to provide general phasing and financial guidance to JAA and airport staff in making policy decisions over the 20 year planning period. The implementation plan stages the proposed improvements based on the interrelationships of individual projects and from the input received from airport staff. The plan also establishes the basic finances for each development item and identifies potential funding sources available.

With the assistance of JAA staff, a list of improvements was prioritized based upon:

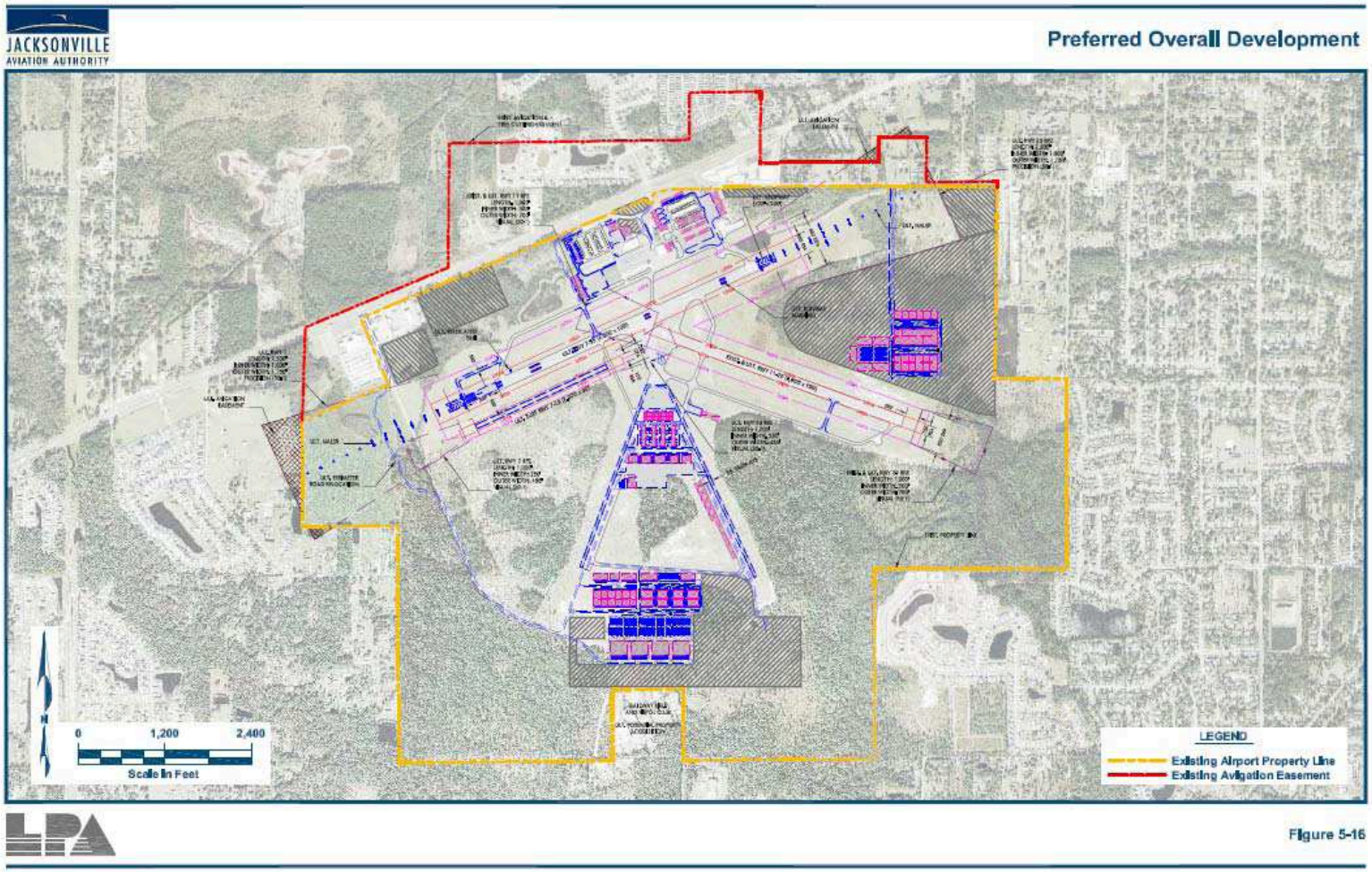
- Urgency;
- Ease of Implementation; and,
- Logic of Project Sequencing

Capital Development Plan and Phasing

The proposed project schedule is divided into three general stages: the short-term (2006-2010), intermediate-term (2011-2015), and long-term (2016-2025). Major recommended development over the twenty-year planning period consists of the following projects:

- Apron rehabilitation, expansion and construction;
- Hangar rehabilitation and construction;
- Runway and Taxiway improvements;
- Navigational Aid improvements;
- Entrance Road relocation;
- Airfield utility and drainage improvements;
- Fenceline relocation;
- Commerce Park Development; and
- Industrial Park Development.

Figure 2, Preferred Airport Development



Source: The LPA Group, Inc. 2006

Anticipated project costs in the short, intermediate and long-term planning period are summarized in **Table 4**.

TABLE 4
20-YEAR CAPITAL IMPROVEMENT PROGRAM

Development Period	Project Costs
Short-Term	$21,741,631
Intermediate-Term	$35,878,426
Long-Term	$86,401,542
Total for 20-Year CIP	**$144,021,600**

Funding Sources

To meet the anticipated need of $144 Million in improvements, JAA will have access to a variety of funding sources in addition to revenue generated from operating activities. These sources include:

- Airport Improvement Program (Federal Government)
- Florida Department of Transportation (FDOT)
- Jacksonville Aviation Authority
- Private Capital Investments, and
- Other federal, state and regional assistance programs

While significant portions of the improvements are eligible through the federal government's Airport Improvement Program (AIP), FAA does not provide the same priority to general aviation (GA) airports as commercial service airports. The current AIP legislation considers a weighted split of project costs determined by a ratio of federal share to local share, represented by a 95 percent and 5 percent share, respectively. The distribution of funding eligibility and the share breakdown is currently available through 2007, after which it will revert back to a 90 percent and 10 percent share between the federal government, state and local authorities unless changed during the Congressional Reauthorization of AIP expected in 2007-2008. **Table 5** summarizes the projected eligible AIP funding for HEG and the projected share of cost.

TABLE 5
20-YEAR CAPITAL IMPROVEMENT PROGRAM SUMMARY
MAXIMUM ELIGIBLE FUNDING

Development Period	Total Project Cost	FAA Entitlement	FAA Discretionary	State Share	Local/Other* Share	Private Share
Short-Term	$21,741,631	$750,000	$1,471,668	$3,856,527	$9,358,531	$6,304,905
Mid-Term	$35,878,426	$750,000	$464,039	$11,916,948	$11,979,449	$10,767,991
Long-Term	$86,401,542	$1,650,000	$2,153,200	$17,092,670	$17,092,670	$48,413,002
Total for 20-Year CIP	**$144,021,600**	**$3,150,000**	**$4,088,907**	**$32,866,146**	**$38,430,650**	**$65,485,898**

*Notes: *Other Funding Sources includes operating revenues generated by the airport as well as loans, bonds and other funding sources*
Source: The LPA Group, Inc. 2007

As part of the Jacksonville Aviation System, HEG is eligible for funding through the JAA's general fund. This eligibility is in accordance with JAA's own determination of project priority among all airports within the Jacksonville system. Because both AIP and FDOT funding for Herlong Airport will most likely be limited, the Master Plan also provides a financially feasible plan based upon probable FAA, FDOT and JAA funding. This funding is summarized in **Table 6**.

TABLE 6
20-YEAR CAPITAL IMPROVEMENT PROGRAM SUMMARY
FEASIBLE PROJECT FUNDING

Development Period	Total Project Costs	FAA Entitlement[1]	FAA Discretionary[2]	State Share[3]	JAA Share[4]
Short-Term	$11,065,135	$750,000	$1,073,931	$2,300,000	$6,941,205
Intermediate-Term	$8,346,025	$750,000	$376,739	$4,288,339	$2,930,948
Long-Term	$10,380,490	$1,650,000	$2,291,950	$3,911,661	$2,526,879
Total 20-Year Period	$29,791,651	$3,150,000	$3,742,619	$10,500,000	$12,399,031

Notes:
[1]FAA Entitlement typically equals $150,000 per year for GA airports
[2]FAA Discretionary Funding equals approximately 90 percent of funding on projects with FAA Priority Scores of 70 or greater.
[3]FDOT Funding typically equals $500,000 per year.
[4]JAA Funding typically equals $500,000 per year unless there is a high priority project.
Source: The LPA Group, Inc. 2007

Historically, FDOT and JAA each provide, on average, $500,000 annually to fund various on-airport improvements. The FAA also provides $150,000 annually through the GA Entitlement Program. FAA Discretionary funding is based upon an FAA project priority score of 70 or greater (i.e. primary runway improvements, safety improvements, fence line relocations, etc.).

The difference between the eligible project funding and the financially feasible project funding is an indication of the private outside funding that Herlong must identify if all projects in the Master Plan are to be undertaken.

SUMMARY

This Master Plan Update balances needed airport improvements with the goals of both JAA and the community thus providing a consensus on how to best meet future demand. The master plan process included extensive coordination, technical evaluations and community participation. The resulting plan for airport development provides for the future needs of the airport and community as a whole.

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INTRODUCTION

Due to recent changes at the Airport and areas surrounding its environs, the Jacksonville Aviation Authority (JAA) undertook an update of the Master Plan for Herlong Airport (HEG), which was previously updated in 2000. One of the primary reasons for the update is based upon the Federal Aviation Administration requirements associated with airports receiving development grants to conduct periodic updates to their airport development plans. In addition, Duval County is experiencing a tremendous increase in residential relocation that has resulted in an increase in construction of residential and commercial developments around the airport.

GENERAL GUIDELINES

The goal of the master plan update is to define current and future aviation demand at HEG, the means and alternatives for addressing this demand, the role of the airport in the local, regional and national aviation system, and the need for and financial feasibility of new infrastructure and airport facilities. This project was funded with grants from the U.S. Department of Transportation Federal Aviation Administration (FAA), the Florida Department of Transportation (FDOT) and the Jacksonville Aviation Authority (JAA) and was programmed to begin in 2005 with completion of the study by the end of 2006.

The airport's master plan serves a variety of functions including projecting future aviation activity and development as a financial planning tool and guiding on-airport and adjacent land uses. The primary objective of the master plan update is to create a 20-year development program that will maintain a safe, efficient, economical, and environmentally acceptable airport facility for the JAA, City of Jacksonville, and Duval County. By achieving this objective, the document should provide guidance to satisfy general aviation demand in a financially feasible and responsible manner. This chapter provides general direction to the study with respect to the development of concepts and plans relating to the future development of Herlong Airport. The general approach is to consider alternative airport development plans, necessary to provide a "balanced" airport system.

KEY ISSUES

Overall, this master plan provides a comprehensive overview of the airport's needs during the next 20 years, including issues related to the timing of proposed development, costs for this development, methods of financing, management options, and a clear plan of action. Prior to the start of this master plan update, key issues within the functional categories of facilities, business, operational, properties and environmental issues, were identified by Airport Management as requiring attention, including:

- Functional Issues
  - Evaluate HEG's role in the JAA Airport System.
  - Evaluate existing pavement conditions and develop a pavement management plan that maximizes pavement life, maintenance and funding over time.
  - Evaluate airfield development options that address the primary runway length requirements, runway safety area standards, precision and non-precision approach capability, and future airfield capacity.
  - Evaluate long-term development options for general aviation, and maximize airside access to general aviation facilities.
  - Develop options to re-use existing facilities.

- Business Issues
  - Evaluate potential for aviation and non-aviation development on the airport including residential operations (fly-in or community airpark), airport industrial and/or commerce park.
  - Prepare capital improvement program (JACIP format) for future development of the airport.

- Operational Issues
  - Evaluate ground access to existing and future airport development areas with emphasis on minimizing existing impacts to the accessibility of existing airport uses, and future on-airport development areas, including Airport Entrance Road.
  - Evaluate land use compatibility issues within the airport environs.
  - Evaluate existing height and land use zoning ordinance for potential impacts to airport operations.
  - Evaluate increased security requirements associated with GA Security guidelines.
  - Evaluate existing equipment and on-airport facilities (i.e. PAPIs).
  - Consider operational issues associated with current fleet mix and airport activities, such as glider operations, skydiving, research and development, aircraft maintenance, fueling, etc.

- Property Issues
  - Consider development of Residential Airpark and associated land transfer.

- ✈ Conduct review of the land area needs of the airport, and the potential absorption of land for aviation related development.
- ✈ Conduct review of land use on and adjacent to the airport for possible impacts.
- ✈ Consider potential relocation of Gateway NFLE and Pistol Club.
- ✈ Develop a current and up-to-date Property Map (formerly Exhibit A).

- Environmental Issues
  - ✈ Provide overview of environmental factors that may act to limit or guide the development of airport property.
  - ✈ Obtain inventory of permitted projects including existing on-airport ponds.

GOALS AND OBJECTIVES

The overall goal of the master plan update is to provide HEG with detailed planning guidance to ensure that Airport facilities and associated land uses will be adequate to meet short-, intermediate-, and long-term aviation demand. This document will serve as a management guide for the implementation of necessary improvements to meet potential aviation activity demand over a planning period of 20+ years, through the end of 2025.

The key objectives associated with this study include:

- ✈ Identify the needed airside, landside, and airspace improvements and recommend options to further optimize the economic aspects of the airport while enhancing the safety and operational capability;
- ✈ Establish an implementation schedule for short-, intermediate-, and long-term improvements and ensure that they are financially feasible;
- ✈ Identify short-term requirements and recommend actions to optimize short-term funding opportunities to be incorporated into the Florida Department of Transportation (FDOT) Joint Automated Capital Improvement Program (JACIP);
- ✈ Insure that short-term actions and recommendations do not preclude long-range planning options;
- ✈ Incorporate the interests of the public and government agencies into the planning process;
- ✈ Remain sensitive to the overall environmental characteristics and needs of the area surrounding the airport; and
- ✈ Incorporate current comprehensive land use (both on- and off-airport property) and recommend developments that are compatible with existing and future land uses.

Therefore, in order to address the various internal and external factors impacting HEG, a list of goals was identified based upon the key issues and objectives impacting HEG in order to provide a guide for the study development. Recommended goals are presented in no particular order, and, thus, no one goal has priority over the other.

Goal No. 1

Continue to meet and enhance the level of service provided to all Airport users.

Objectives:

- Provide adequate runway capacity for estimated demand in terms of aircraft type and annual and hourly operations.
- Provide adequate runway length to meet existing and forecast operations needs.
- Provide opportunities for development of services associated with potential charter and corporate GA, military, flight training, and recreational flying operations.
- Provide for potential integration of military and non-military operations.
- Provide other aviation related support facilities required for a full range of aviation services.
- Provide insight into the estimated future needs of hangar facilities.

Goal No. 2

Provide guidelines for future development, while satisfying anticipated demand.

Objectives:

- Implementation of non-aviation development to enhance revenue diversification.
- Provide adequate airside and landside facilities to meet anticipated demand.
- Effectively market potential commercial and non-commercial aviation facilities.
- Develop self-sustaining commerce and/or industrial parks, which will benefit the Airport and community as a whole.
- Develop a schematic for incorporating 3rd party funding for future development.

Goal No. 3

Provide an Airport that is safe and reliable.

Objectives:

- Provide navigational aids (NAVAIDS) including global positioning system (GPS) and non-GPS approach options, flight support services, and meteorological facilities, which enhance the safety and reliability of operations under all weather conditions.
- Protect FAA mandated safety areas, runway protection zones (RPZs), and other clear zones.
- Minimize possible obstructions to air navigation.
- Provide adequate fire fighting, rescue and emergency services, access roads, facilities, equipment, and personnel to maintain minimum response time under all conditions.
- Ensure that airside and landside operations and facilities meet all applicable security standards.
- Ensure that aircraft parking facilities are adequately sized and easy to negotiate.
- Develop facilities to meet the demands of the current and future critical aircraft.
- Address the need and timeline for a control tower with the expected development of the SATS and Air Taxi segments of the industry.

Goal No. 4

Develop the Airport and its vicinity to minimize negative environmental impacts.

Objective:

- Identify the major environmental issues of concern.
- Minimize potential environmental impacts, and provide special attention to minimizing noise impacts, air and water pollution, and wetland impacts.
- Consider the use and development of airport property to minimize any adverse impacts on other environmental concerns while maintaining a safe environment for users and adjacent land owners (i.e. timber harvesting and wildlife control).
- Design and select noise abatement measures that minimize the number of people exposed to noise above Day-Night Noise Level (DNL) greater than 65 decibels, if applicable.
- In selecting noise abatement actions, avoid actions that would adversely affect capacity, impose restrictions on Airport use that would be discriminatory, or that could erode prudent margins of safety.
- When necessary, encourage local construction restrictions to reduce impact of Airport/aviation.

Goal No. 5

Promote the development of compatible land use in undeveloped areas within the Airport vicinity.

Objectives:

- Promote land use planning and development objectives, for on- and off-Airport land use, which are compatible with the anticipated long-range needs of the Airport and the community as a whole.
- Designate areas for future development hangar homes, maintenance, commerce park, etc.
- Locate Airport facilities so that growth may be controlled through land-use planning and zoning.
- Consider the impacts of the Gun Club on Airport Operations.

Goal No. 6

Develop an Airport that supports local and regional economic goals while accommodating new opportunities or shifts in development patterns.

Objectives:

- Achieve a level of service and user convenience such that the Airport is a positive factor in regional economic development decisions.
- Achieve capacities of the airfield, the terminal area systems, and industrial park/Commerce Park, so that the Airport may be an attractive location for GA, maintenance, and other aviation related activities.
- Provide appropriate and achievable commercial opportunities adjacent to and on the Airport.
- To assure economic feasibility, identify an equitable distribution of user charges; distribute the burden of capital investment, maintenance, and operating costs, while keeping overall costs within an acceptable level.
- Identify financial alternatives and funding sources available for the implementation of aviation and non-aviation projects.
- Quantify financial resources available for project funding.
- Develop an airport layout plan (ALP) that easily integrates with existing and proposed transportation infrastructure, to encourage economic growth.

Goal No. 7

Minimize aircraft delay associated costs to all airfield users (i.e. military operations, recreational pilots, experimental aircraft, flight training facilities, etc.).

Objectives:

- ✈ Minimize airspace congestion and delays for GA aircraft through procedural changes and/or provision of additional NAVAIDS.
- ✈ Minimize airside congestion through construction of runways, taxiways, and aprons, when the costs of providing the additional capacity are less than the additional operating costs associated with aircraft delays.

Goal No. 8

Ensure adequate and convenient ground access to the Airport.

Objectives:

- ✈ Provide safe access and easy-to-follow signs to Airport roadways and facilities.
- ✈ Provide adequate lane capacity on roads leading to the Airport, to serve existing and future activity.
- ✈ Provide adequate land capacity on internal circulation roadways serving functional areas (terminal, GA, commerce park, etc.).
- ✈ Provide parking facilities (for GA, terminal, commerce park, etc.) that are conveniently located and easily accessible.
- ✈ Maintain close coordination with Regional Planning Council, Metropolitan Planning Organizations (MPO), FDOT, and other transportation groups.

These goals and objectives reflect policy goals to be reached through the master planning process. They include the ultimate development of self-supporting facilities to serve the existing and future aviation needs of the region; the achievement of compatible land uses in the vicinity of the Airport; and provisions for the type of development that will yield the most public benefit of the investment represented by the Airport. Finally, these goals must be manageable within existing limitations of funds and design principles.

As noted, the airport is located within a residential populated area and, therefore, any future developments identified in this study will consider potential community impacts. Considering this, to ensure community and government participation in this study, a Technical Advisory Committee (TAC)

was created to provide technical review of the working papers and to provide input into the entire master plan process. The committee was assembled by Airport Management and includes representatives from JAA, FAA, FDOT, City of Jacksonville, Duval County, airport tenants and the public/community. Multiple opportunities will be available for community and governmental representatives to participate in this study, including through representatives serving on the study's technical advisory committee and through three public meetings held in conjunction with the CPAC meetings. It is important to note that the study results and the future developments presented in this report represent a plan to guide the Jacksonville Aviation Authority in meeting demand as they develop; therefore, no development should be undertaken until there is a clearly identified need for it.

REGULATORY GUIDELINES

This Master Plan is prepared in accordance with Federal Aviation Administration (FAA) Advisory Circulars **AC 150/5370-6B**, *Airport Master Plans,* and **AC 150/5300-13**, **Change 10**, *Airport Design,* in conjunction with the FDOT's *Guidebook for Airport Master Planning* and other related standards. Furthermore, current guidance will be incorporated from the FAA Airports District Office (Orlando), FDOT Aviation Office, JAA, and other local government agencies. Planning efforts of the city, county, region, state, and nation have been coordinated in the Master Plan to provide the most preeminent plan for the benefit of HEG and all of the participating organizations.

In addition, in order to assist JAA in considering the environmental factors that may impact future development at HEG, the following national, state and local legislation was considered. This overview of regulatory guidelines will assist the sponsor and the planning consultant in developing alternatives that are tailored to the airport's size, unique setting and operating environment while also considering the airport's environmental setting, the identification of environmentally related permits and the potential impacts of recommended development projects. An in-depth analysis of existing environmental conditions at HEG is provided in **Chapter Two**, *Inventory of Existing Conditions*.

Water Quality

Legislation

The Federal Water Pollution Control Act, as amended by the Clean Water Act provides the authority to establish water control standards, control discharges into surface and subsurface waters, develop waste treatment management plans and practices, and issue permits for discharges and for dredged and filled materials into surface waters. The Fish and Wildlife Coordination Act requires consultation with the United States Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (FFWCC) when any alteration and/or impounding of water resources is expected. The Federal National Pollution Discharge Elimination System (NPDES) permit program provides regulations that govern the quality of stormwater discharges into water resources of the United States.

Regulatory Agencies

The United States Army Corps of Engineers (COE), the Florida Department of Environmental Protection (FDEP), and the Saint Johns River Water Management District (SJRWMD) have jurisdiction over and regulate activities that alter the landscape and disrupt water flow to wetland areas and surface waters through the Environmental Resource Permitting (ERP) Program in Florida. The program forwards permit applications to other state and federal agencies including the FFWCC and the USFWS. Permitting requirements for construction that exceeds five acres are specified by NPDES regulations and administered by the FDEP.

Historical, Architectural, Archaeological, and Cultural Resources

Legislation

The National Historic Preservation Act of 1966 and the Archaeological and Historic Preservation Act of 1974 provide protection against development impacts that would cause change in historical, architectural, archaeological, or cultural resources.

Regulatory Agencies

The Department of State, Division of Historical Resources is responsible for promoting historical, archaeological, museum, and folk culture resources in Florida.

Biotic Communities

Legislation

The Fish and Wildlife Coordination Act (48 Statute 401 as amended; 16USC et. Seq.) considers impacts to habitat and wildlife. Section 2 of this act requires consultation with USFWS, the United States Department of the Interior (USDI), and state agencies that regulate wildlife whenever water resources are modified by a federal, public, or private agency under federal permit of license.

Regulatory Agencies

The USFWS and FFWCC have authority under the act to provide comments and recommendations concerning vegetation and wildlife resources.

Endangered and Threatened Species

Legislation

The Endangered Species Act of 1973 (ESA), as amended, requires federal agencies, in consultation with and assisted by the USFWS, to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat of such species. Section 7 of the Act states that federal agencies must review their actions: If those actions will affect a listed species or its habitat, they must consult with the United States Fish and Wildlife Service.

Regulatory Agency

The USFWS, the Florida Department of Agriculture and Consumer Services (FDACS), and the FFWCC have jurisdiction over and administer native endangered and threatened species permits for Florida. During the consultation process, the USFWS will determine the significance of potential impacts to federally protected species and will recommend methods to avoid or mitigate for impacts that may occur as a result of the proposed projects.

The FFWCC Threatened and Endangered Species Section reviews and issues permits that involve Florida's protected terrestrial animal species. The FFWCC Bureau of Protected Species Management reviews and issues permits that involve Florida's protected aquatic wildlife species. The FDACS Division of Plant Industry is responsible for providing protection to Florida's protected native plant species that are classified as endangered, threatened, or commercially exploited.

Wetlands

Legislation

Executive Order 11990, Protection of Wetlands, mandates that each federal agency take action to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance their natural values. On the federal level, wetlands are regulated according to Section 404 of the Clean Water Act, which requires a permit for dredging and filling activities that take place in Waters of the United States, including wetlands.

The legal framework for the regulation of activities in wetlands by the State of Florida and by the State's Water Management Districts is provided, in part, by Chapter 373 of the Florida Statutes, *the Florida Water Resources Act of 1972*, specifically 373.414 which states that an activity regulated under this part will not be harmful to water resources; water quality standards will not be violated; and such activity in, on, or over surface waters or wetlands, is not contrary to the public interest. If such an activity significantly degrades or is within an Outstanding Florida Water, the applicant must

provide reasonable assurance that the proposed activity will be clearly in the public interest. Specifics concerning permit requirements are codified in Chapter 40, parts A through E, of the Florida Administrative Code.

Regulatory Agencies

In Northeast Florida, the COE, the FDEP, and the SJRWMD have jurisdiction over and regulate activities that alter the landscape and disrupt water flow to wetland areas and surface waters through the State ERP Program.

Floodplains

Legislation

Executive Order 11988, "Floodplain Management" defines floodplains as lowland areas adjoining inland and coastal waters, especially those areas subject to one percent or greater chance of flooding in any given year.

Regulatory Agencies

The Federal Emergency Management Agency (FEMA) has produced Flood Insurance Rate Maps (FIRMs) for communities participating in the National Flood Insurance Program. The maps detail the 100-year and 500-year base flood elevations. The State of Florida administers and requires compensation for floodplain impacts through the ERP program. SJRWMD has jurisdiction over Northeast Florida.

Coastal Zone Management Program

Legislation

The Coastal Zone Management Act (CZMA) aims to preserve, protect, develop, and where possible, restore and enhance the resources of the nation's coastal zone. The Florida Coastal Management Act of 1978 (Chapter 380, Part II, Florida Statutes) authorized the FDEP to develop a comprehensive state coastal management program based upon existing Florida Statutes and Rules.

Regulatory Agency

The FDEP is responsible for directing the implementation of the Florida Coastal Management Program (FCMP). The program is based on a cooperative network of nine agencies including the FDEP, the Florida Department of Community Affairs (DCA), FFWCC, Department of State (DOS), Governor's Office of Planning and Budgeting (OPB), Department of Transportation (DOT),

Department of Health (DOH), and the Division of Forestry within the DACS. SJRWMD is also a cooperating member in the consistency review process for Northeast Florida.

Farmland

Legislation

The Farmland Protection Policy Act of 1981 (FPPA) requires the evaluation of farmland conversion to non-agricultural areas. Prime farmland is land best suited for producing food, feed, forage, fiber, and oilseed crops. This land has the quality, growing season, and moisture supply necessary to produce sustained crop yields with minimal energy and economic input.

Regulatory Agencies

The National Resources Conservation Service (NRCS) has jurisdiction and should be consulted if farmland is to be converted to non-agricultural use by a federally funded project. The consultation determines whether the farmland is classified as "prime" or "unique." If it is, the Farmland Protection Act requires rating the farmland conversion impacts based upon the length of time farmed, amount of farmland remaining in the area, level of local farm support services, and the level of urban land in the area.

MASTER PLANNING PROCESS

The Master Plan provides an effective written and graphic representation of the ultimate development of the Airport and associated land uses adjacent to the Airport, while establishing a schedule of priorities and phasing for the various improvements proposed. The planning document presents a conceptual development plan, over a 20+-year period, for the Airport. Realistic master planning is a continuing and evolutionary process due to the justification and funding required during the implementation process. Many adjustments are likely to take place to meet the changing industry before facilities are designed, approved, and built to completion.

An approved Airport Master Plan provides long-range recommendations for development of an airport and is essential for an airport to qualify for federal and/or state assistance for realization of the plan. Government assistance is provided in the form of financial grants to the airport sponsor. The grants are provided by the FAA through the Airport Improvement Program (AIP) funded by the Federal Aviation Trust Fund and by the FDOT through the Aviation Fuel Tax that funds approximately 60 percent of the State Aviation Program and through the Public Transportation Fund for the remaining 40 percent.

This master plan update provides a systematic outline of the development actions required to maintain and further develop airfield and landside facilities. This process provides the officials responsible for

scheduling, budgeting and ultimate funding of airport improvement projects with an advance notice of the future needs of the Airport. By phasing airport improvements, the development can be conducted in an orderly and timely fashion.

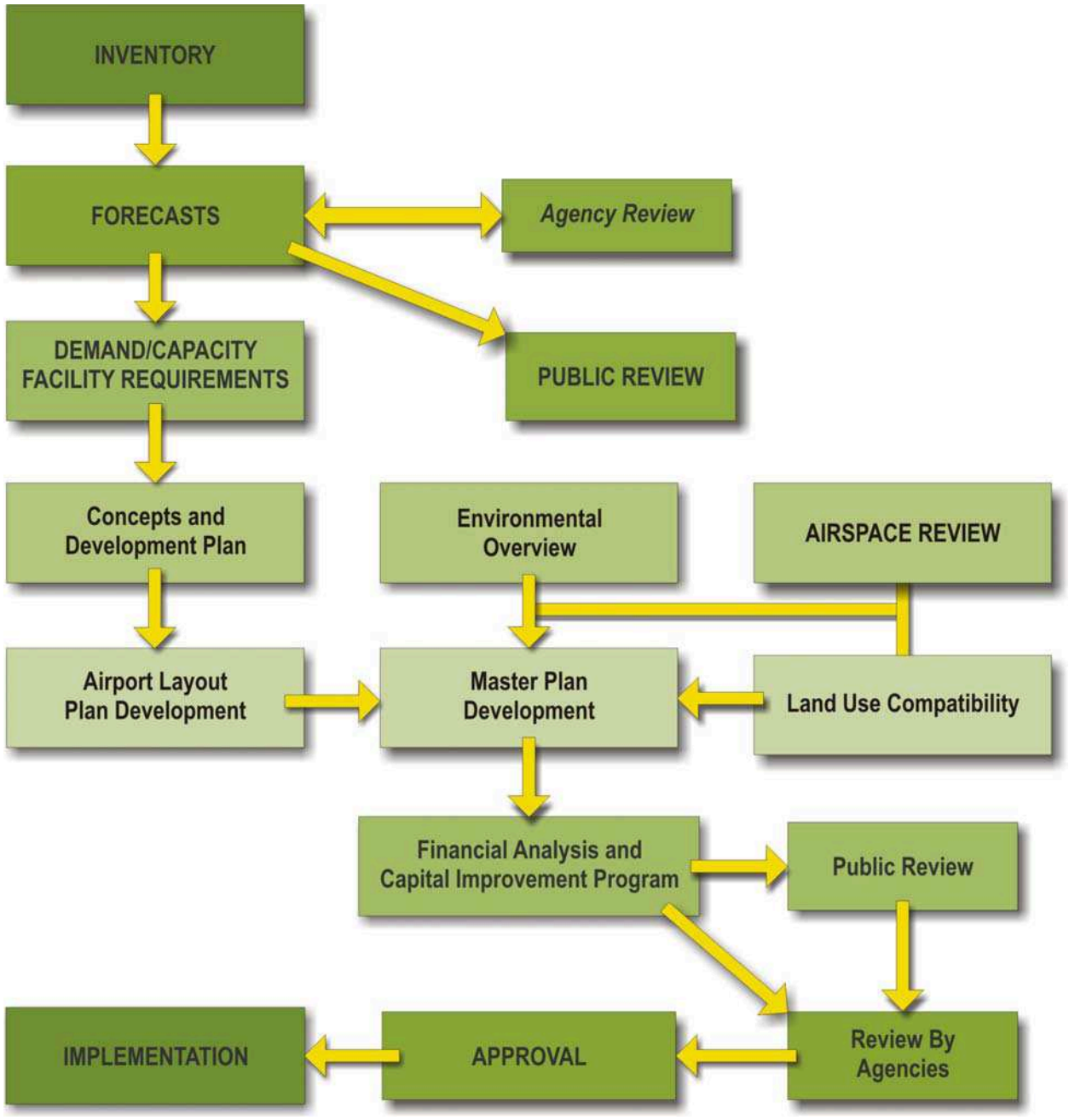
To accomplish the objectives identified, the study included the following tasks:

- Conduct an inventory of existing documents related to the airport, the physical airport facilities, demographics of the airport service area, and airport environment;
- Collect historical operational data, conducting tenant interviews, and forecasting aviation activity through the year 2025;
- Conduct a comprehensive analysis of current airport facilities, determination of trends and activities affecting the airport, the identification and analysis of potential trends in the aviation industry including potential impacts to future operations;
- Evaluate and compare the airfield capacity to expected aviation activity;
- Determine the airport facilities required to meet forecast demand;
- Create a concise Airport Layout Plan (ALP) drawing set reflecting the proposed improvements throughout the master planning time period
- Compile a schedule of the proposed improvements, including cost estimates, phasing and financial feasibility of each proposed improvement; and
- Develop a cost feasible Capital Development Plan (CIP) in FDOT JACIP Format.

A graphic representation of this process is depicted in **Figure 1-1**, *Steps in the Master Planning Process.*

Throughout this process, reviews of the master plan report were conducted at key points such as at the completion of the forecasts and during development of the alternatives. This ensured that input was received from key stakeholders, such as JAA, FAA and FDOT. The individual report chapters provide a detailed explanation of these key steps. It should be noted that each step in the master plan process was built upon information and decisions made during the previous steps. Taken as a whole, the master plan process addressed key issues as identified above as well as illustrated how the study objectives were met.

Figure 1-1
Steps in the Master Planning Process



CHAPTER TWO
Existing Conditions

FORWARD

As outlined in the Federal Aviation Administration (FAA) **Advisory Circular (AC) 150/5070-6B**, *Airport Master Plans* and the Florida Department of Transportation (FDOT) *Guide to Airport Master Planning*, the initial step in the Master Plan Update for Herlong Airport (HEG) is the collection and evaluation of information about the Airport and the area it serves. This chapter provides a physical inventory and description of facilities and services now provided at the Airport. The inventory will include:

- The background information about the Jacksonville area and a description of development that has recently taken place at the Airport.
- The population and socioeconomic information, which provides a sign of possible future development in the Jacksonville area.
- A comprehensive review of the existing regional plans and studies to determine potential influence on the development and implementation of the Airport Master Plan.

An accurate and complete inventory is essential to the success of any master-planning document. The objective of the inventory task is to provide background information essential to the completion of the Master Plan Update. The inventory task for HEG was accomplished through physical inspection of the facilities, field interviews, telephone interviews, and review of available and appropriate administrative records. Additional information was collected from documents and studies about the Airport and the Jacksonville area. These documents include the following:

- Airport Master Plan Update, December 2000
- The existing Airport Layout Plan (ALP), 2004
- Jacksonville Aviation Authority (JAA) Financial Statements
- JAA fuel and aircraft operations records for HEG, and
- Miscellaneous reports generated by the University of Florida Bureau of Economic and Business Research, Florida Aviation System Plan and FAA Aerospace Forecasts, 2005-2016.

This chapter provides a general description of HEG and its service area. It describes data relevant to the Airport's history, geographic location, climate, and operational role in today's aviation environment.

In addition, an inventory of all primary airfield components was included in the August 2005 inventory process. The August 2005 inventory included the following data pertaining to:

- Runway and taxiway:

  - Lengths and widths
  - Designations,
  - Lighting and marking
  - Orientations, and
  - Separations
- Meteorological data;
- Pavement conditions;
- Landing and navigational aids;
- Air traffic control procedures and airspace configuration; and
- Obstacles to the surrounding airspace, and
- Runway protection zones

The following sections provide a concise account of applicable airfield assets at the Airport.

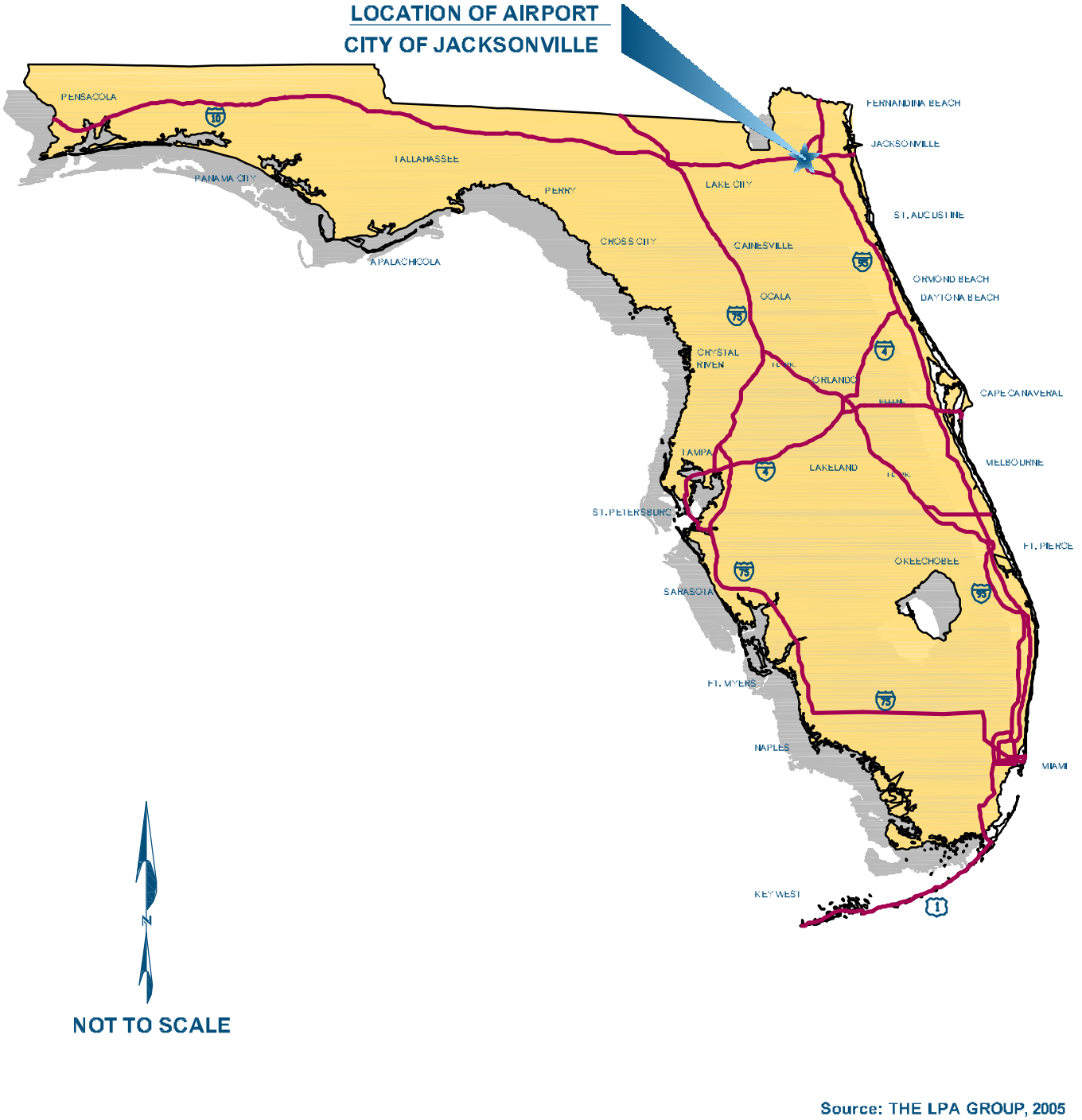
AIRPORT SETTING

The Jacksonville Airport System consists of four airports (Herlong, Jacksonville International Airport (JAX), Craig (CRG) and Cecil Field (VQQ)), with each serving a distinct need within the Jacksonville and northeast Florida transportation system. Herlong Airport located approximately eleven (11) miles southwest of downtown Jacksonville, is promoted as "Jacksonville's premier general aviation recreational and sport flying airport". The Airport is currently a prime recreational site for small private planes, hot air balloons, skydiving, gliders and other small or experimental aircraft. Herlong supports JAX by accommodating sport aeronautical operations, thereby serving as a reliever airport to JAX.

The existing airport property covers 1,434 acres located approximately three (3) miles southwest of Interstate 10 and 295 as shown in **Figure 2-1**, *Airport Location*. The current airport elevation, defined as the highest point on the usable runways, is 87 feet above mean sea level (MSL). According to the 2000 Airport Layout Plan, the existing latitude and longitude coordinates for HEG's airport reference point (ARP) is 30° 16' 30" N and 81°48' 20" W. As part of the review, these coordinates were verified.

JACKSONVILLE AVIATION AUTHORITY

Airport Location Map



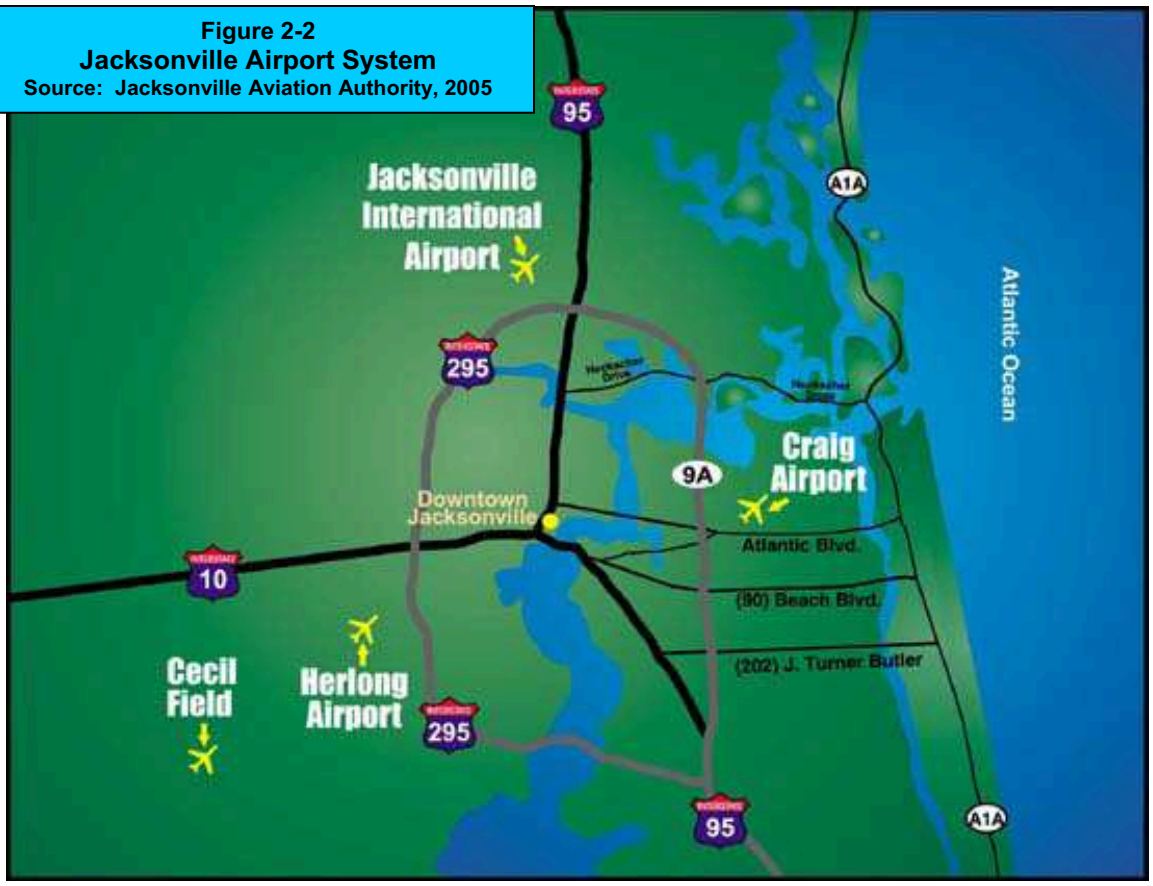
Source: THE LPA GROUP, 2005

LPA

Figure 2-1

The Airport is bound by Normandy Boulevard, a four-lane divided highway, to the north and residential communities to the south, east and west. New single family housing at the time of this writing is located along Normandy Boulevard directly north of the Airport entrance road. Due to high demand for residential housing, significant development is occurring adjacent to the airport. Impacts associated with residential use will be discussed in more detail in **Chapter 5**, *Demand Capacity and Facility Requirements*.

Figure 2-2
Jacksonville Airport System
Source: Jacksonville Aviation Authority, 2005



As shown in **Figure 2-2**, Jacksonville International Airport (JAX) is located approximately 25 nautical miles to the northeast, Craig Airport (CRG) is located 15.5 nautical miles to the east and Cecil Field (VQQ) is located approximately 10.2 nautical miles to the southwest of the Airport. All three airports serve Duval County and the Jacksonville Metropolitan Statistical Area (MSA).

In addition to the airports within the Jacksonville Airport System, three major military installations are located within a 25 nautical mile radius of Herlong Airport including Whitehouse Naval Outlying Field (NOLF), Jacksonville Naval Air Station and Mayport Naval Station.

Other airports, which serve the Jacksonville region and are located within a 40-nautical mile radius of HEG are outlined in **Table 2-1** and shown in **Figure 2-3**, *Airports in the Region*.

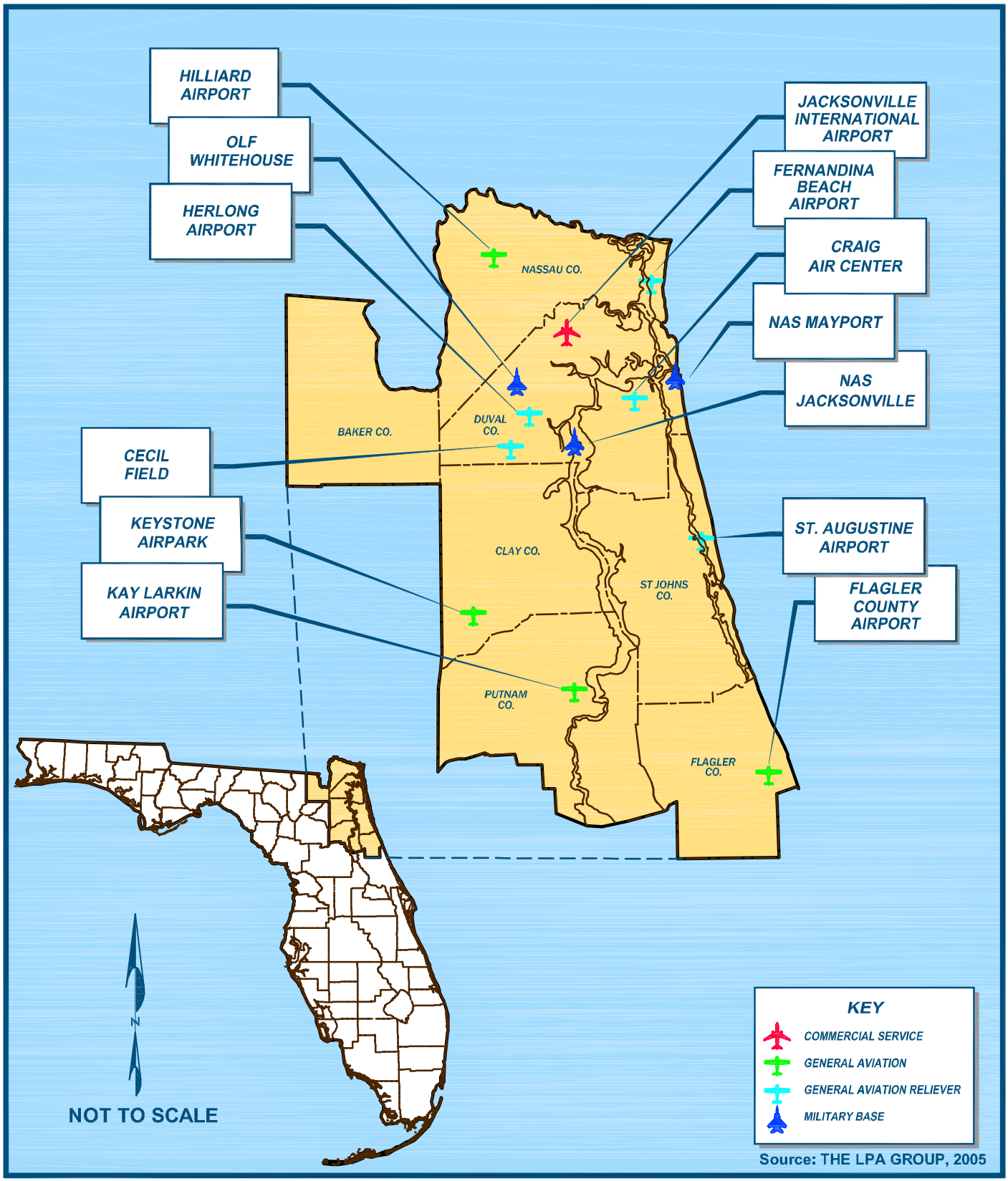
TABLE 2-1
PUBLIC GENERAL AVIATION AIRPORTS IN THE REGION

Airport	Distance from HEG (nm)	Runway and Dimensions	Published Instrument Approach Procedures
Cecil Field (VQQ)	10.2	18L-36R (12,504' x 200') 18R-36L (8,003' x 200') 9R-27L (8,003' x 200') 9L-27R (8,002' x 200')	ILS - VOR - GPS
Craig Airport (CRG)	15.5	5-23 (4,004' x 100') 14-32 (3,998' x 100')	ILS/LOC - VOR/DME - GPS
Fernandina Beach Airport (55J)	26.8	13-31 (5,152' x 100') 8-26 (4,999' x 100')	GPS
St. Augustine Airport (SGJ)	30.8	13-31 (7,996' x 150') 6-24 (2,701' x 60') 2-20 (2,614' x 75') 17W/35W (12,000' x 1,000') 18W-36W (12,000' x 500') 12W-30W (5,000' x 1,000')	ILS - VOR - GPS
Keystone Airpark (42J)	28.9	4-22 (5,044' x 100') 10-28 (4,899' x 75')	VOR/DME - GPS
Palatka Municipal – Lt. Kay Larkin Airfield Airport (28J)	37.6	9-27 (6,000' x 100') 17-35 (3,500' x 75') 12-30 (3,000' x 75)	NDB

Source: Airnav.com (2005)

JACKSONVILLE AVIATION AUTHORITY

Airports in the Region



Source: THE LPA GROUP, 2005

LPA

Figure 2-3

CLIMATE

Weather conditions are an important consideration in the planning and development of an airport. Temperature is a critical component in determining runway length, and wind speed and direction determine runway orientation. Also the frequency of cloud cover limits local area visibility and designates the need and type of navigational aids (NAVAIDs) and lighting. These issues will be discussed in further detail in **Chapter 5,** *Demand Capacity and Facility Requirements*.

The northern Florida region enjoys mild climate during the winter months and hot and humid temperatures with afternoon thunderstorms during the spring and summer. Freezing temperatures occur occasionally with occasional snow flurries during the winter about once every 5-7 years.

Historical data from the National Weather Service (NWS) in Jacksonville reflects temperatures typically ranging from 52.8° F in January to 82.1° F in July. The mean daily maximum temperature recorded for the warmest month of the year (July) was 91.7°F. Data collected over a 30-year period indicates monthly average total precipitation range from 2.19 inches during November to 7.93 inches during August. The average annual rainfall total is 51.31 inches per year.

WIND COVERAGE

Historical wind conditions were evaluated to determine the percentage of wind coverage at HEG. New wind rose data was compiled from the National Oceanic and Atmosphere Administration's National Climatic Data Center (NCDC), located in Asheville, NC. As aircraft takeoff and land into the wind, it is recommended by the FAA that sufficient runways be provided to achieve 95 percent wind coverage. The 95 percent wind coverage is computed based on the crosswind not exceeding 10.5 knots (12 MPH) for the smallest aircraft with ARCs of A-I and B-I; 13 knots (15 MPH) for ARCs A-II and B-II; 16 knots (18 MPH) for ARCs A-III, B-III, C-I through D-III; and 20 knots (23 MPH) for ARCs A-IV through D-VI. The "95 percent" criterion is applicable to all weather conditions: visual flight rules (VFR), instrument flight rule (IFR) and below minimum conditions. If 95 percent wind coverage is not provided at an airport for the maximum crosswind component of the critical aircraft, then the addition of a crosswind runway should be considered.

FAA Advisory Circular (AC) 150/5300-13, Change 10, *Airport Design,* suggests that a period of at least ten (10) consecutive years of on-site wind data should be examined when carrying out an airfield wind coverage evaluation. According to the Master Plan Update, the prevailing winds at HEG are predominantly from the northeast direction, from the coastal regions.

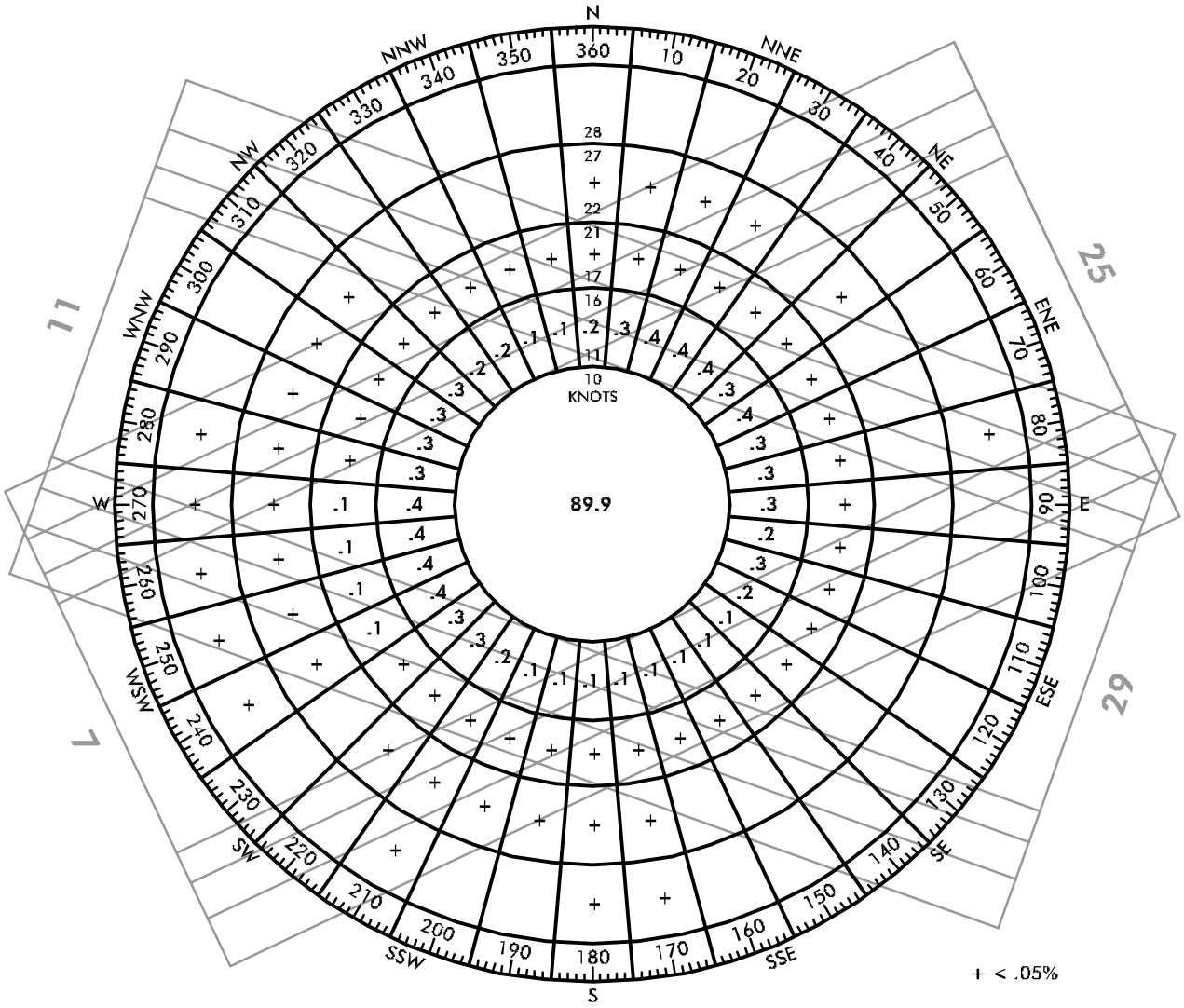
Using **Airport Design, Version 4.2D**, all weather, VFR and IFR wind coverage percentages was analyzed. This information is presented in **Table 2-2.** Wind coverage is only included for the crosswind speed that corresponds to the approach category and airplane design group that would utilize that runway. No change was noted from the previous master plan update.

TABLE 2-2
PERCENTAGE WIND COVERAGE

Airfield Configuration	10.5-Knots (12 mph)	13-Knots (15 mph)	16-Knots (18.4 mph)	20-Knots (23 mph)
	All-Weather Conditions			
Runway 7-25	96.99%	98.67%	99.77%	99.96%
Runway 11-29	95.71%	97.84%	99.59%	99.91%
Total Combined	98.73%	99.59%	99.93%	99.99%
	VFR Conditions			
Runway 7-25	97.08%	98.70%	99.78%	99.97%
Runway 11-29	95.92%	97.99%	99.61%	99.92%
Total Combined	98.87%	99.64%	99.94%	99.99%
	IFR Conditions			
Runway 7-25	96.25%	98.35%	99.68%	99.95%
Runway 11-29	93.97%	96.55%	99.42%	99.89%
Total Combined	97.41%	99.11%	99.85%	99.99%

All weather wind rose and IFR wind rose data is provided in **Figures 2-4** and **2-5**, respectively.

All Weather Wind Rose



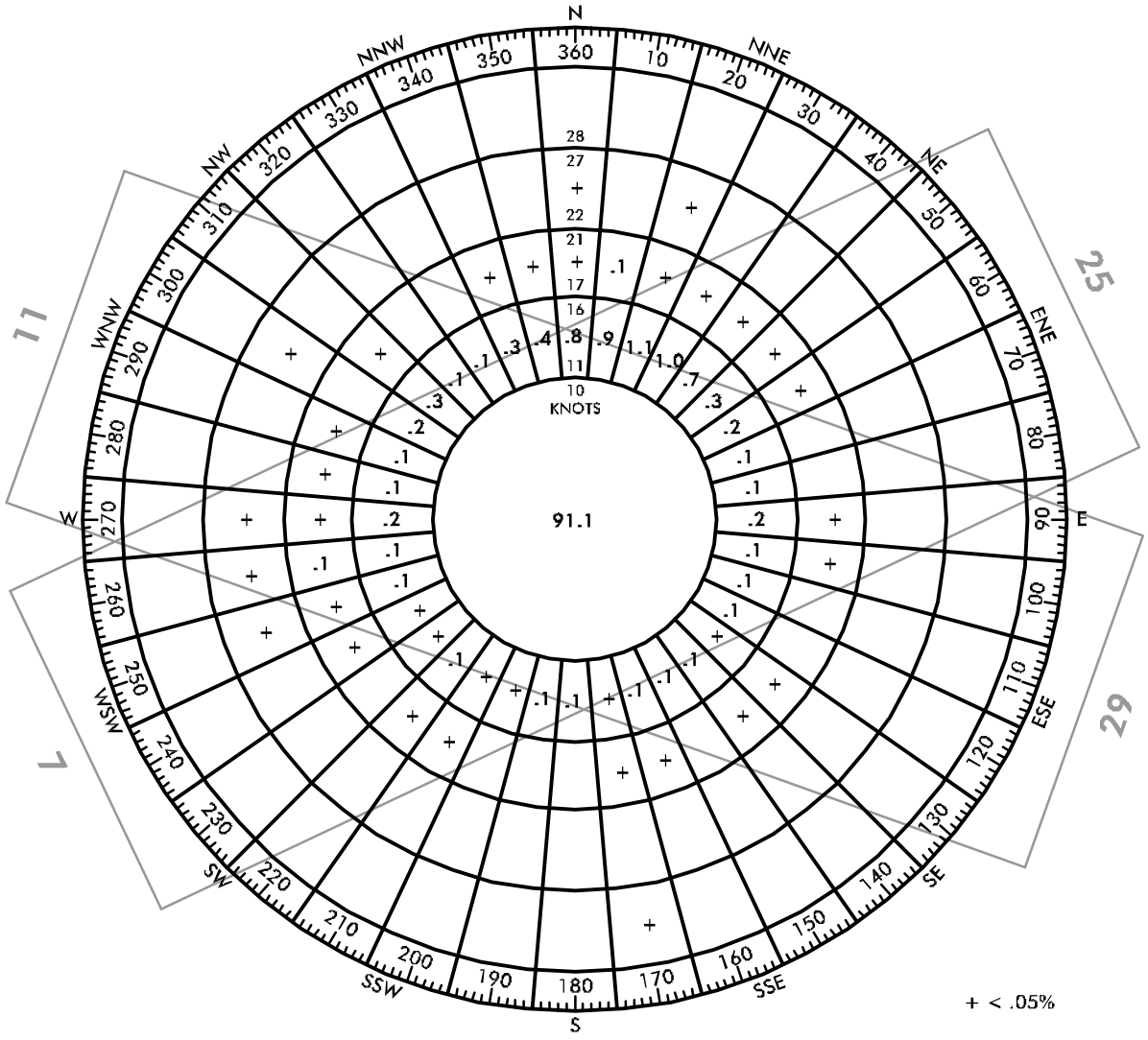
WIND COVERAGE	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
RUNWAY 7/25	96.99%	98.67%	99.77%	99.96%
RUNWAY 11/29	95.71%	97.84%	99.59%	99.91%
TOTAL COMBINED	98.73%	99.59%	99.93%	99.99%

CEIL/VIS: ALL

SOURCE: NATIONAL CLIMATIC DATA CENTER
ASHEVILLE, NC

83015 OBSERVATIONS MADE
OVER THE PERIOD 1989-1998
STATION 72206 CECIL FIELD, FL, US

IFR Wind Rose



WIND COVERAGE	13 KNOTS
RUNWAY 7 *	91.24%
RUNWAY 25 *	80.38%
RUNWAY 11 *	88.13%
RUNWAY 29 *	91.18%

* BASED ON A 5 KNOT TAILWIND COMPONENT

WIND COVERAGE	13 KNOTS
RUNWAY 7/25	98.35%
RUNWAY 11/29	96.55%
TOTAL COMBINED	99.11%

CEIL/VIS: CEIL < 1000 FT. AND/OR VIS. < 3.00 MI.

SOURCE: NATIONAL CLIMATIC DATA CENTER
ASHEVILLE, NC

83015 OBSERVATIONS MADE
OVER THE PERIOD 1989-1998
STATION 72206 CECIL FIELD, FL, US

FAA CERTIFICATION AND CLASSIFICATION

FAA Classification

As a planning tool and guide, the FAA classifies aircraft based upon two key characteristics: Approach Speed and Wingspan. The Approach Speed Category ranges from A to E, with the letters representing approach speed of aircraft. The Airplane Design Group ranges from I to VI. The Roman Numerals represent the aircraft's wingspan. **Table 2-3** provides a complete list of the Approach Speed Categories and Airplane Design Group according to **FAA Advisory Circular 150/5300-13, Change 10**, *Airport Design.* These two categories are then used to determine the Airport Reference Code (ARC), which signifies the most demanding aircraft type expected to utilize the facility. The ARC is then used to determine the standards and dimensions of the critical surface and separations of the airfield facilities.

TABLE 2-3
FAA AIRCRAFT APPROACH CATEGORIES AND AIRCRAFT DESIGN STANDARDS

Aircraft Approach Category	Approach Speed
A	Speed less than 91 knots
B	Speed 91 knots Speed to less than 121 knots
C	Speed 121 knots Speed to less than 141 knots
D	Speed 141 knots Speed to less than 166 knots
E	Speed greater than 166 knots
Airplane Design Group	**Wingspan**
I	49 feet and less
II	49 feet up to but not including 79 feet
III	79 feet up to but not including 118 feet
IV	118 feet up to but not including 171 feet
V	171 feet up to but not including 214 feet
VI	214 feet up to but not including 262 feet

Source: FAA AC 150/5300-13, Change 10, Airport Design

Based upon current aircraft operations and the longest length of its primary runway, the ARC of HEG is a **B-II**.

Although HEG does accommodate limited business jet aircraft, the majority of aircraft operations at HEG are comprised primarily of single-engine and multi-engine piston aircraft equal to or less than 12,500 pounds, ultralight and glider aircraft. Thus, its primary runway length of 4,000 feet accommodates existing aircraft demand. However, if the significant increase in the use of HEG by larger multi-engine piston, turboprop and turbine engine aircraft continues, then the current runway length will not adequately meet both manufacturer and FAA runway length requirements for safe operation.

Based upon aircraft records, there are currently 162-based aircraft on the field as of 2005. The existing based aircraft fleet mix is shown in **Table 2-4**.

TABLE 2-4
2005 BASED AIRCRAFT FLEET MIX

Aircraft Category	Based Aircraft	Percentage of Total
Ultra-lights	5	3%
Seaplane	1	0.6%
Experimental	0	0%
Glider	12	7.4%
Helicopter	4	2.47%
Single Engine	128	74%
Multi-Engine	15	9.26%
Jet Engine	5	3%
Military	0	0%
Total	170	100%

Source: The JAA, 2005 and The LPA Group Incorporated, 2006

HISTORIC DATA

AIRPORT HISTORY

HEG was constructed by the U.S. Navy during World War II and was used primarily as a training base. In 1947, the U.S. Navy deeded the property to the City of Jacksonville. In the mid-1960's, the City turned over ownership of the Airport to what was then known as Jacksonville Port Authority (JAXPORT). In 2001, the Jacksonville Airport Authority (now the Jacksonville Aviation Authority) was created by the State legislature to own and operate public airports in Duval County (JIA, Craig, Herlong and Cecil Field).

As part of the Jacksonville Airport System, HEG became Jacksonville's premier recreational and sport flying airport. In 2001, it was the recipient of the Florida Department of Transportation's General Aviation Airport of the Year award.

AIRPORT ACREAGE

Current airport acreage encompasses approximately 1,434 acres. The southern portion of the airport property includes several acres of low-lying areas exhibiting wetland characteristics and undeveloped wooded areas.

PREVIOUS STUDIES AND REPORTS

The following studies and reports were obtained from the Airport and other sources during the inventory phase of this project:

- Herlong Master Plan Update, December 2000;
- Airport Spill Prevention Control Plan (SPCC);
- Herlong Airport Building Condition Survey, 2004;
- Florida Aviation System Plan: Northeast Florida Metropolitan Area;
- National Plan of Integrated Airport Systems 2002-2005;
- FAA Aerospace Forecast, 2005-2016; and
- Florida Aviation System Plan 2025 Statewide Overview

These documents were reviewed for valuable historic data and significant insight into the process of long-range planning at the Airport.

ROLE OF AIRPORT

JACKSONVILLE AVIATION AUTHORITY (JAA) PLAN/DUVAL COUNTY SYSTEM PLANS

Herlong Airport is owned and operated by JAA. The Airport's current role as identified in the *Florida Aviation System Plan (2005 – 2009)* is to accommodate general aviation activity, provide vital aircraft storage facilities, and operational general aviation relief to commercial passenger service airports in the Northeast Florida Metropolitan Area. As a result, HEG is one of five designated reliever airports in the Northeast Florida Metropolitan Area.

Herlong Airport, Craig Airport, Fernandina Beach Municipal Airport, St. Augustine-St. Johns County Airport, and Cecil Field all provide reliever service to JAX, the region's only commercial service airport, by accommodating a significant portion of GA activity in the region. Since Herlong Airport is promoted as "Jacksonville's premier general aviation recreational and sport flying airport", it is recognized not only by JAA but FDOT and FAA as an essential element within the regional and national airport system.

Currently, JAA serves as the Fixed Base Operator (FBO) at HEG providing terminal facilities, hangar space, tie-down areas and fueling. Within the last five years, JAA built 24 new individual T-Hangar facilities to meet demand for aircraft storage. During the inventory phase of the master plan update, aircraft storage at the airport was at 100 percent capacity.

FLORIDA AVIATION SYSTEM PLANS (FASP)

The Florida Aviation System Plan (FASP) is the FDOT's 20-year aviation system plan for development at Florida's publicly owned airports. The FASP is an on-going system supported by multiple databases that provide current data on Florida's aviation industry. Because the plan must

reflect and keep pace with Florida's aviation growth, it often addresses a variety of issues including intermodal transportation networking, economic impact of airports on local and regional economy, and the development of long-range visions for aviation planning. The overall purpose of the FASP is to enhance Florida Department of Transportation's (FDOT's) goal of "providing a quality system that meets the existing and future growth needs of the state of Florida."

HEG is located in the Northeast Florida Metropolitan Area as defined by the FASP, which is comprised of the six counties: Baker, Clay, Duval, Putnam, Nassau and St. Johns. The current primary airport within the region is the Jacksonville International Airport (JAX) operated by the JAA. As stated earlier, JAA also operates Craig, Herlong and Cecil Field airports.

Craig Airport, located just minutes from Downtown Jacksonville and area beaches, acts as a general and corporate aviation reliever airport to JAX. Craig Airport provides aircraft sales, service and maintenance, avionics repair, complete airframe and power plant maintenance, electronics and instrument sales, aerial advertising, aircraft charter services, flight training and aircraft and automobile rentals. However, due to its proximity to residential neighborhoods, the airport has become noise sensitive and has implemented a Noise Abatement Program.

Cecil Field, a military base decommissioned in 1999, is defined as a public-use airport within the FASP system, which provides maintenance, repair and overhaul (MRO) services to general aviation and specialty cargo operations. However, as stated earlier, consideration is being given to reconfiguring Cecil Field back to a military facility, which may have an impact on Herlong operations.

Other airports within this Continuing Florida Aviation System Planning Process (CFASPP) Metropolitan Area include St. Augustine, Fernandina Beach, Kay Larkin (Palatka), Keystone Airpark, and Hilliard (Turf). Most of these airports have a 5,000-foot or greater runway, which accommodates both private and corporate air traffic. Many also contain sufficient industrial park space suitable for a wide variety of industrial and business interests. They also provide easy access to some of the worlds most sought after visitor destinations and a number of recreational interests.

Military aviation and other activity continue to play a vital economic role within the Northeast Metropolitan Area. The Navy's Fleet Area Control Surveillance Facility Jacksonville (FACSFACJAX) is located at Naval Air Station Jacksonville. FACSFACJAX, as an active member of the Area Committee, has maintained an excellent rapport with the Northeast Metropolitan Area's aviation community and the FAA's Air Route Traffic Control Center (ARTCC) in Hilliard, Florida.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS (NPIAS)

The FAA integrates individual master planning efforts into the National Plan of Integrated Airport Systems (NPIAS). The NPIAS provides a standardized system to evaluate airport roles, effectiveness and eligibility for grants-in-aid on a national level.

There are a number of FAA classifications for general aviation airports according to the *National Plan of Integrated Airport Systems (NPIAS) 2007 - 2011*, which includes over 3,344 airports. Principally, an airport's role identifies the aircraft it can accommodate, or in the case of commercial service airports, the routes and markets it serves nonstop.

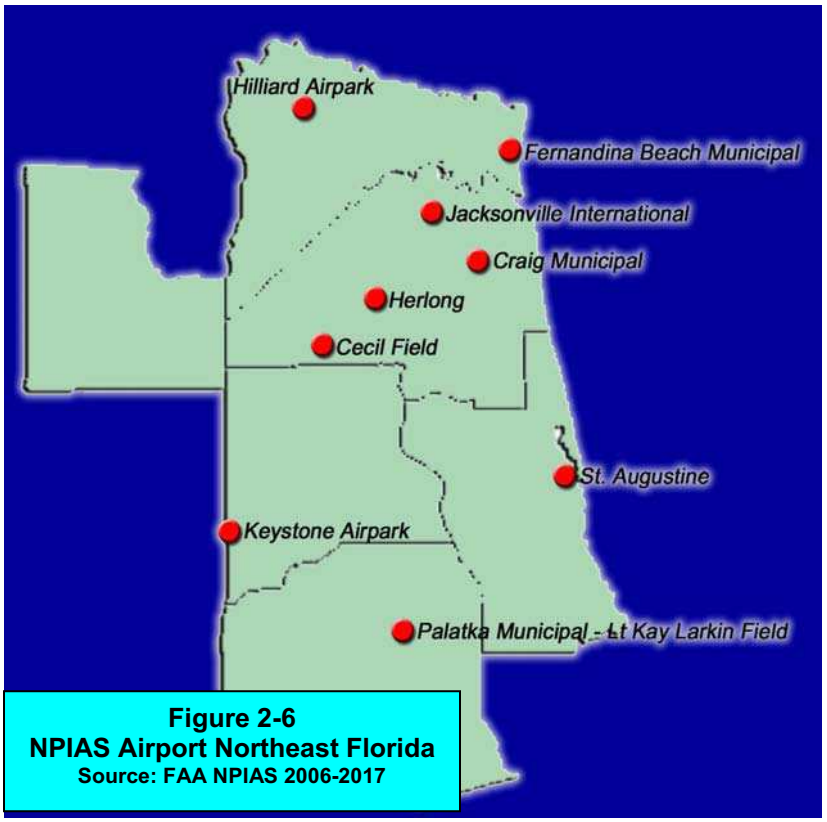


Figure 2-6
NPIAS Airport Northeast Florida
Source: FAA NPIAS 2006-2017

With respect to category of service, HEG is designated as a Reliever Airport. Reliever Airports are high capacity general aviation airports in major metropolitan areas, which provide pilots with an attractive alternative to using congested hub airports. They also provide general aviation access to the surrounding area. The 260-reliever airports have an average of 228-based aircraft, and together account for 27 percent of the Nation's general aviation fleet. Airports within the northeast Florida metropolitan statistical area are shown in **Figure 2-6.**

AIR TRAFFIC CONTROL AND AIRSPACE STRUCTURE

The National Airspace System (NAS) is defined as the common network of U.S. airspace, including the following:

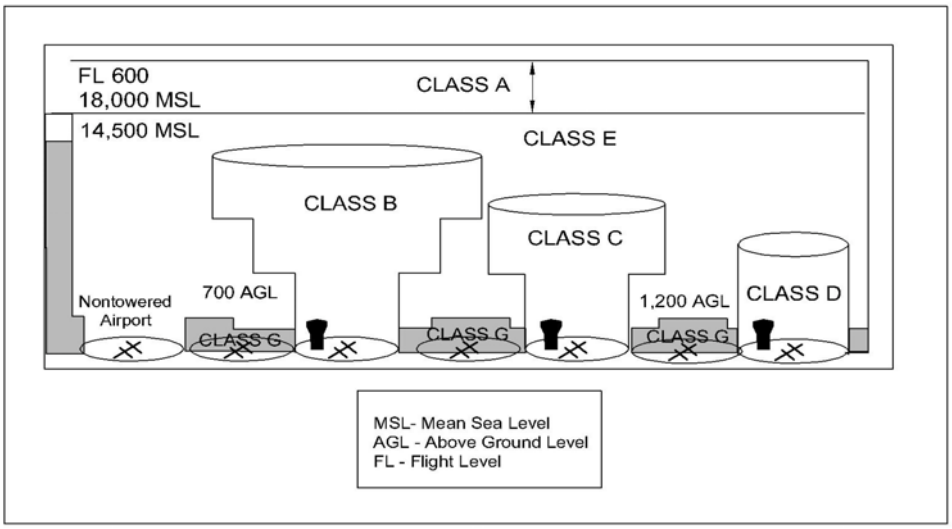
- Air navigation facilities,
- Airports and landing areas,
- Aeronautical charts and information,
- Associated rules, regulations and procedures,
- Technical information,
- Personnel, and
- Materials.

System components shared jointly with the military are also included.

Airspace in and around HEG like many airports in Florida includes a combination of civilian and military airspace. Since HEG is not equipped with an air traffic control tower (ATCT), it's airspace is designated Class E (controlled) with floor 700 feet above MSL and extends upward to 18,000 feet MSL. However, HEG is surrounded by Class D and C airspace due to its proximity to the

Whitehouse Naval Outlying Field, Jacksonville Naval Air Station and Mayport Naval Station, as well as Jacksonville International Airport and Cecil Field. As a result, contact with Jacksonville Air Traffic Control is recommended during approach and departure procedures. Airspace Classes as shown in **Figure 2-7** illustrates an example of standard Class E airspace in relation to all other airspace.

Figure 2-7
Airspace Classes



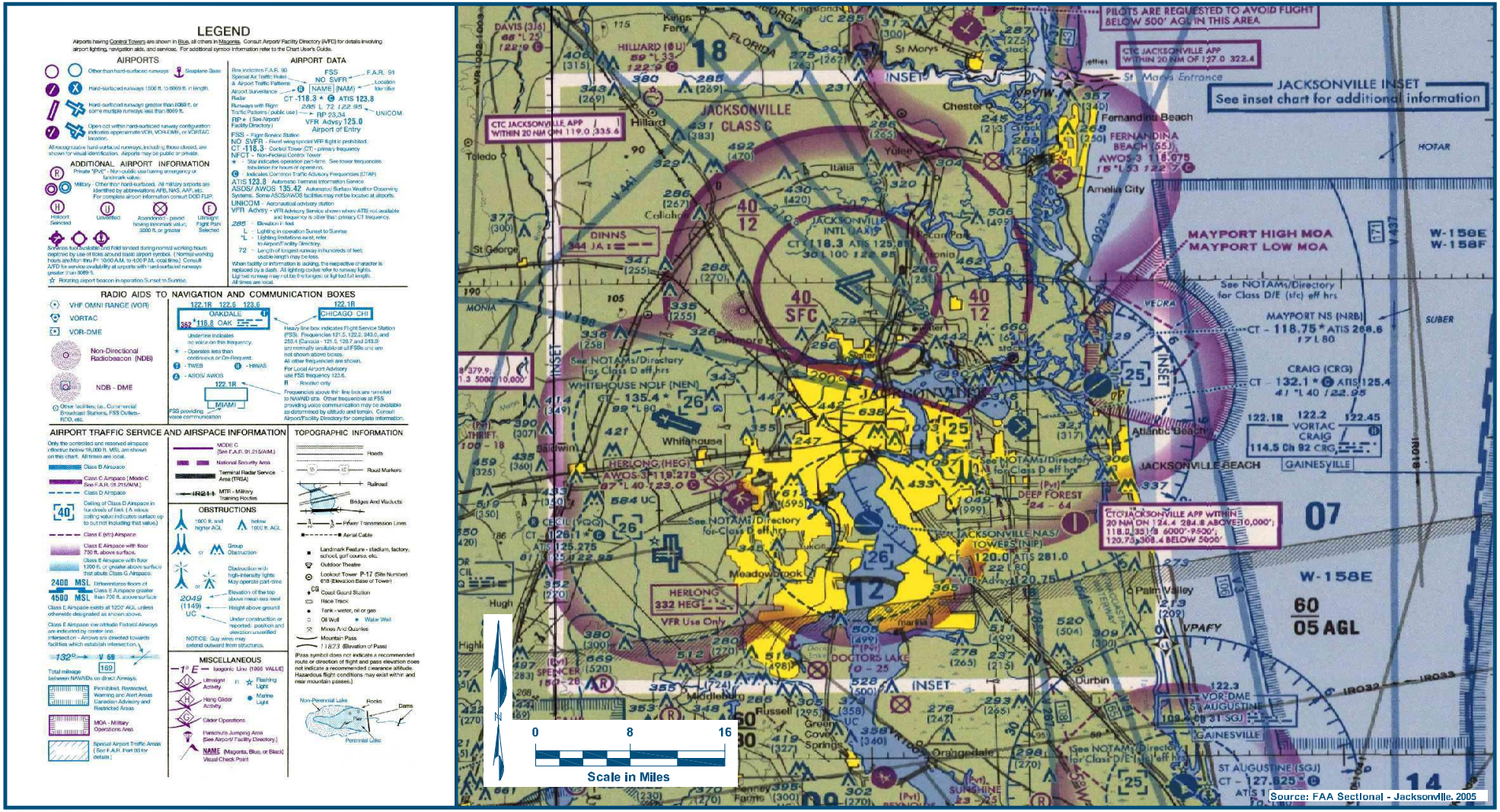
Source: Federal Aviation Administration, Air Traffic Division, 2005

SPECIAL USE AIRSPACE

Military operations areas and airports located in the surrounding region are of considerable importance when evaluating sources of competition for airspace and aviation services. Whitehouse NOLF, Jacksonville NAS and Mayport NAS are home to a number of training operations within the region. As a result, many training exercises take place in the numerous special use airspace areas surrounding the airport. Special use airspace areas include Alert Areas, Military Operating Areas (MOAs), and Restricted Areas (RAs), which are located east, north and west of HEG. Civilian pilots operating near military operations areas are required to adhere to all applicable NOTAMS and contact the appropriate controlling agency for clearance. The special use airspace areas typically have a high volume of rotary and high-speed fixed wing activities and can have ceilings as high as 17,500 feet.

In relation to Herlong Airport, the Mayport MOA is located to the east, Quick Thrust MOA is located to the north and Moody and Live Oak MOAs are located to the West. An RA exists to the southwest near Camp Blanding. Because of the location of these alert areas and commercial airspace associated with JAX, it is virtually impossible to access HEG without first contacting the appropriate air traffic authorities. Special use airspace within the vicinity of HEG is illustrated in **Figure 2-8,** *Airspace Obstructions.*

Airspace Obstructions



TRAFFIC PATTERN

The pattern elevation for HEG, based upon the 2006 Approach Plates, is approximately 1,100 feet above mean sea level (AMSL), with a field elevation of 87 feet MSL. Departures for Runway 7 should climb on heading 060° to 800 feet prior to turning on-course. Additionally, departures for Runway 11 must climb straight ahead along the runway heading to 800 feet AMSL before turning on-course

Arrivals to Runways 11, 29, 7 and 25 typically maintain a left hand traffic pattern. Aircraft maintain the downwind leg within one-half mile of the runways, and keep the base leg within one-half mile of the runway. The traffic pattern for Runways 7-25, 11-29 and Glider Traffic are shown in **Figures 2-9** and **2-10.** Since no control tower exists at HEG, all aircraft should comply with non-towered traffic control procedures.

GENERAL AIRPORT INFORMATION

Use of a close-in traffic pattern and strict adherence to this pattern at the Airport is important. The airspace at HEG is currently a one-mile cutout of Cecil Airfield's Class D airspace. Pilots and aircraft that wish to use instrument approach procedures at HEG according to the 2006 Approach Plates may utilize a circling or straight NDB-A approach to Runway 25 or a straight-in GPS aproach to Runway 25. To aid this approach, precision approach path indicators (PAPI's) are located on the left sides of Runways 7 and 25, providing adequate clearance to existing obstructions. However, due to technical problems with the existing PAPI system, primarily associated with power surges and outages, the operating reliability of this system is limited. **Table 2-5,** *Non-Precision Instrument Approach Minimums (VOR/GPS),* provides a summary of non-precision instrument approach minimums at HEG.

JACKSONVILLE AVIATION AUTHORITY

Approach & Departure Patterns For Runways 7 & 25

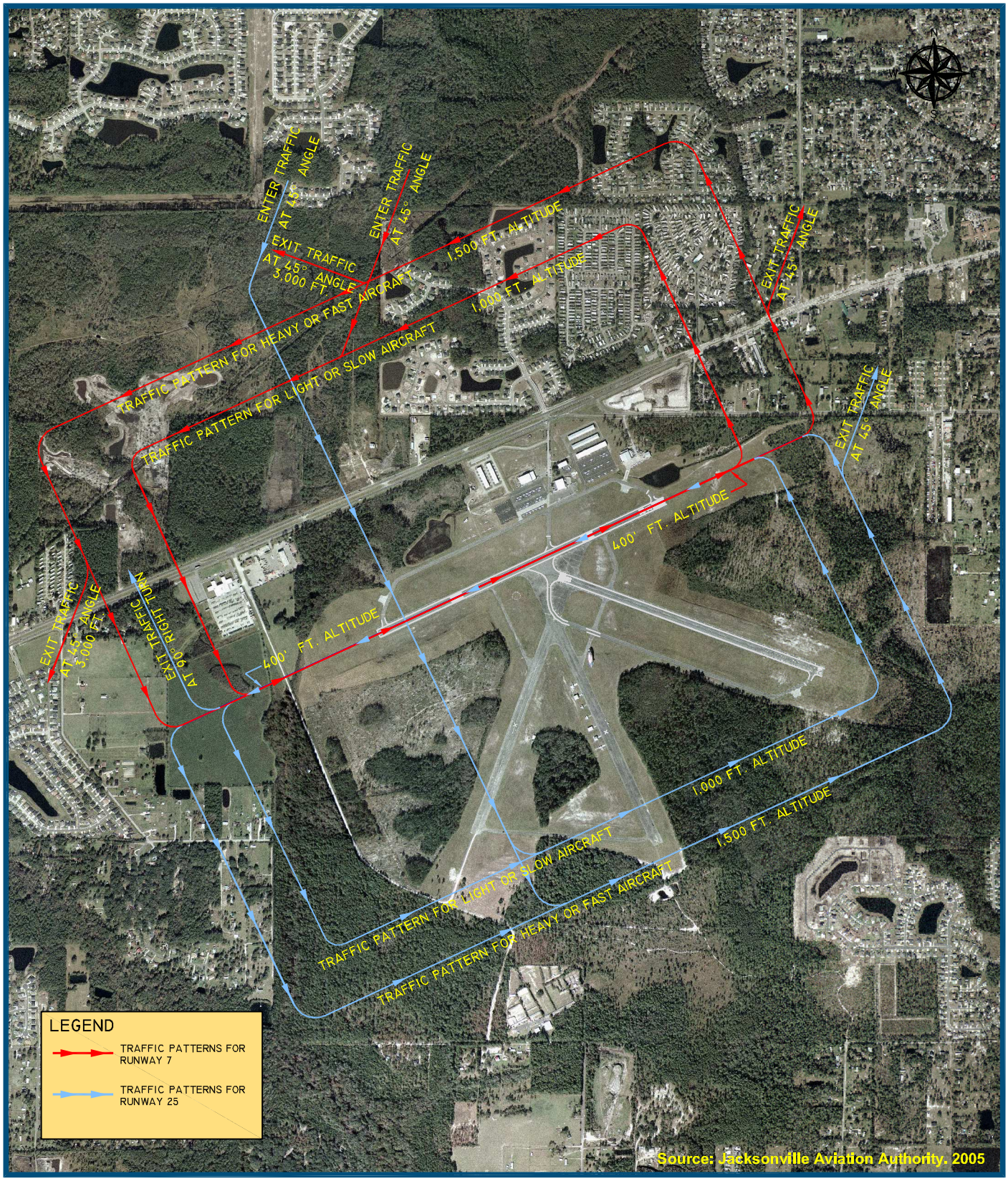


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Figure 2-9

JACKSONVILLE AVIATION AUTHORITY

Approach & Departure Patterns For Runways 11 & 29

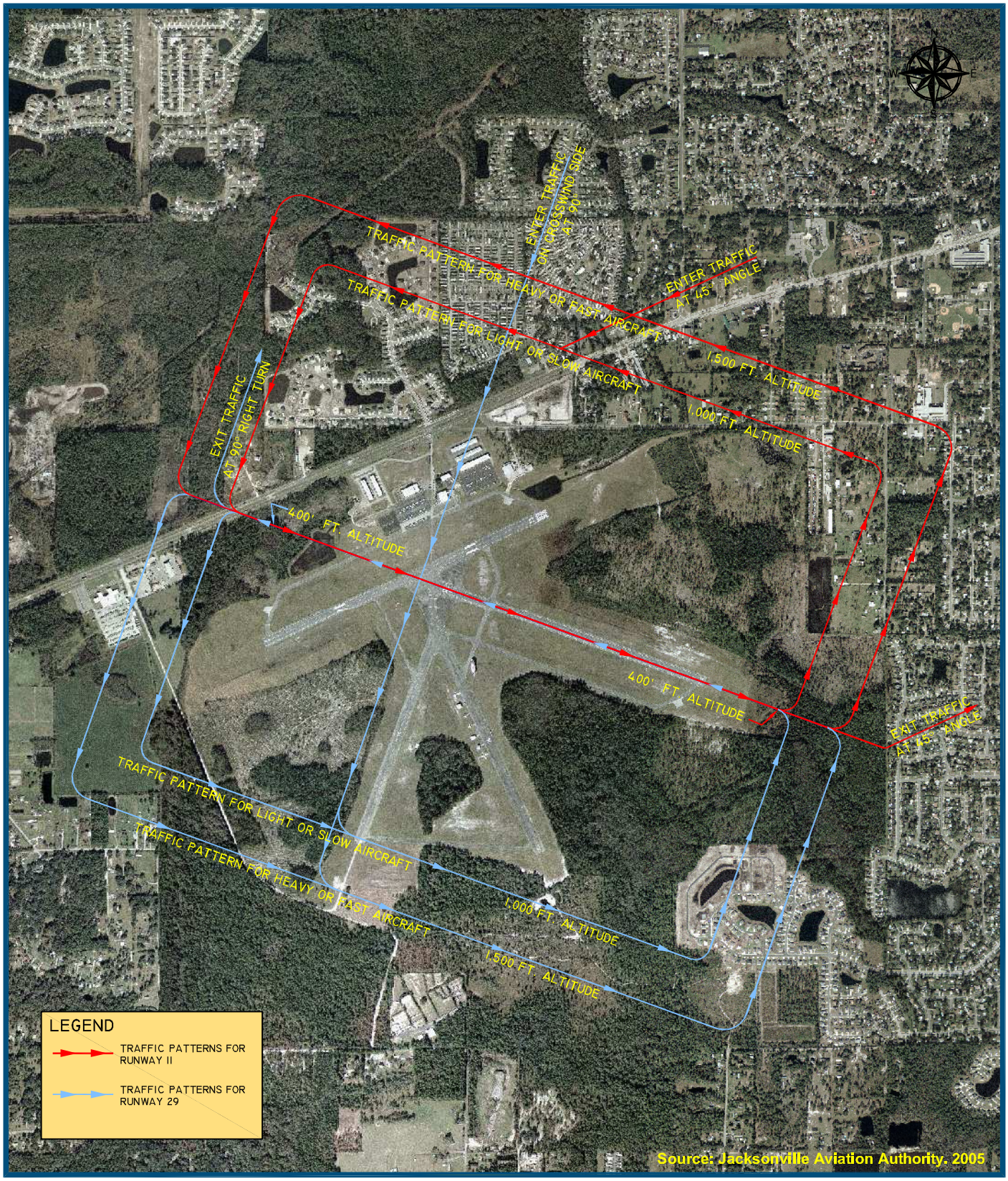

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Figure 2-10

TABLE 2-5
NON-PRECISION INSTRUMENT APPROACH MINIMUMS (GPS)

Instrument Procedure	Height above Touchdown Zone Elevation (feet) MSL	Ceiling	Visibility (Miles)
Runway 25 *Straight-In*	513	600	1 (A, B), 1½ (C) & 1¼(D)
Runway 25 *Circling*	513	600	1 (A, B), 1½ (C) & 2(D)

Notes: Minimums based on local altimeter setting. Visibility letters refer to aircraft approach categories, as defined by FAA. Source: FAA, Southeast U.S. Terminal Procedures, March 17, 2005.

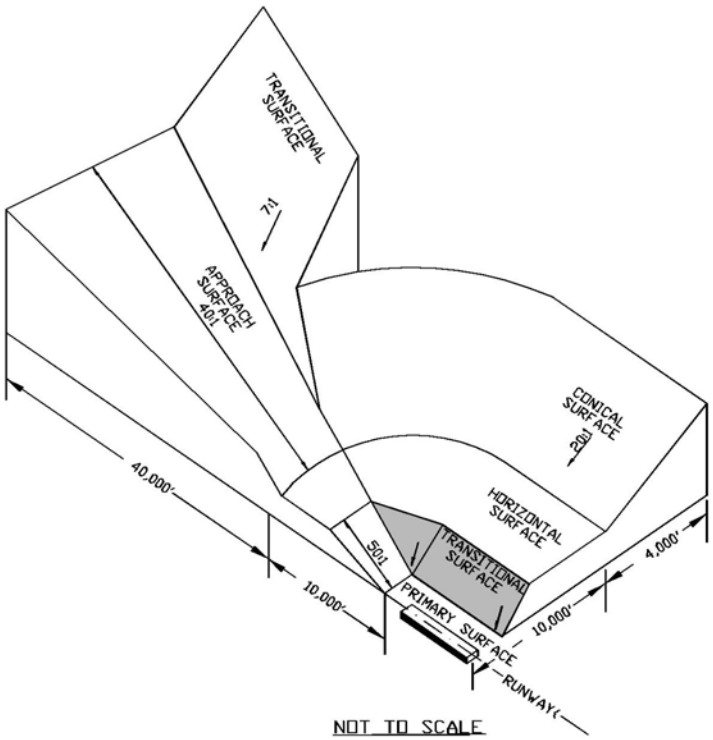
Aircraft en route to, or in the vicinity of, HEG may receive pertinent information about the Airport, weather and current traffic patterns, through Unicom frequency 123.0 (CTAF). Local air traffic should be monitored through this frequency when conducting operations at the Airport.

FAR PART 77 SURFACES – OBSTRUCTIONS TO NAVIGABLE AIRSPACE

Federal Aviation Regulations (FAR) Part 77 Obstructions to Navigable Airspace establishes standards for determining obstructions in navigable airspace. An obstruction is defined as any object of natural growth, terrain, or permanent or temporary construction and/or alteration, including related equipment and materials used therein, which penetrates any portion of the "imaginary surfaces". FAR Part 77 defines "imaginary surfaces" which govern the vertical height of obstacles within the vicinity of airports. These surfaces will vary in size and slope depending on available approaches at each runway end.

By superimposing these "imaginary surfaces" over the airport, it is possible to determine the severity of existing obstructions. The Part 77 Surfaces also provide vertical boundaries for existing and new construction alterations. Once objects have been identified as obstructions, FAA must review them to determine if they pose a "hazard to air navigation". If determined as such, the obstacle must be removed or altered to eliminate the penetration. If the obstruction were to remain, dramatic changes to the airfield and/or approach procedures may be required. An example of such changes may be a displaced runway threshold or increasing approach minimums to provide obstruction clearance. **Figure 2-11** illustrates typical FAR Part 77 surfaces.

Figure 2-11
Typical Part 77 Surfaces



Source: Federal Aviation Administration, Airports Division, 2000

EXISTING AIRSIDE FACILITIES

A description of each of the components of the Airport as they existed in August 2005 is summarized in the following subsections. These airport components include: the airfield, general aviation facilities, on-airport access and parking, and other miscellaneous, ancillary facilities as shown in **Figure 2-12,** *Existing Airfield.*

The description of the following facilities provides the basis for the airfield demand/capacity analysis and the determination of facility requirements to be presented in the subsequent chapters. The airside facilities generally include those required to support the movement and operation of aircraft. While this most certainly involves the airport's runways and taxiways, it also includes the following:

- Available instrument approaches;
- Airfield lighting; pavement markings;
- Takeoff and landing aids; and
- Airfield signage.

Figure 2-12, *Existing Airfield,* depicts the current physical airside facilities at HEG.

In addition to the physical characteristics of the runway, there are other safety-related criteria. These criteria are defined not only in **FAA AC 150/5300-13, Change 10**, but also by FAR Part 77, *Objects Affecting Navigable Airspace*. While there are various imaginary surfaces associated with each runway, the criteria for each will be discussed in **Chapter 4**, *Demand Capacity and Facility Requirements*. Details pertaining to the requirements for a Runway Safety Area (RSA), Runway Object Free Area (ROFA), and Runway Protection Zone (RPZ) will be addressed as part of the facility requirements determination, while the FAR Part 77 surfaces will be included in the text associated with the Airport Layout Plan set.

APPROACH & NAVIGATIONAL AIDS

The Airport currently utilizes several visual navigational aids (NAVAIDS), including runway lighting and two, four-box precision approach path indicator lights (PAPI-4) on Runway 7-25. Since Runway 7-25 is the primary runway, JAA replaced the older visual approach slope indicator lights (VASIs) with PAPI-4s. The Runway 7 PAPI-4 is located to the north of the runway, and the Runway 25 PAPI-4 is located south of the runway. Both were installed approximately 200 linear feet from their respective thresholds as shown in **Figure 2-12**, *Existing Airfield.* The PAPI-4 consists of a light array, situated perpendicular to the runway that serves as a visual reference to guide pilots. A typical four light array will display two white lights and two red lights when the aircraft is flying 'on' the glide slope. Aircraft flying below glide slope will see the PAPI as all red and to those flying above the glide slope the PAPI will appear all white. However, since its installation the reliability of the PAPI-4 system has been limited due to on-going technical problems, primarily associated with power spikes, which, at the time of this writing, JAA is trying to resolve. Currently, Runway 11-29 is not equipped with any type of approach lighting system since it provides primarily crosswind coverage.

JACKSONVILLE AVIATION AUTHORITY

Existing Airfield

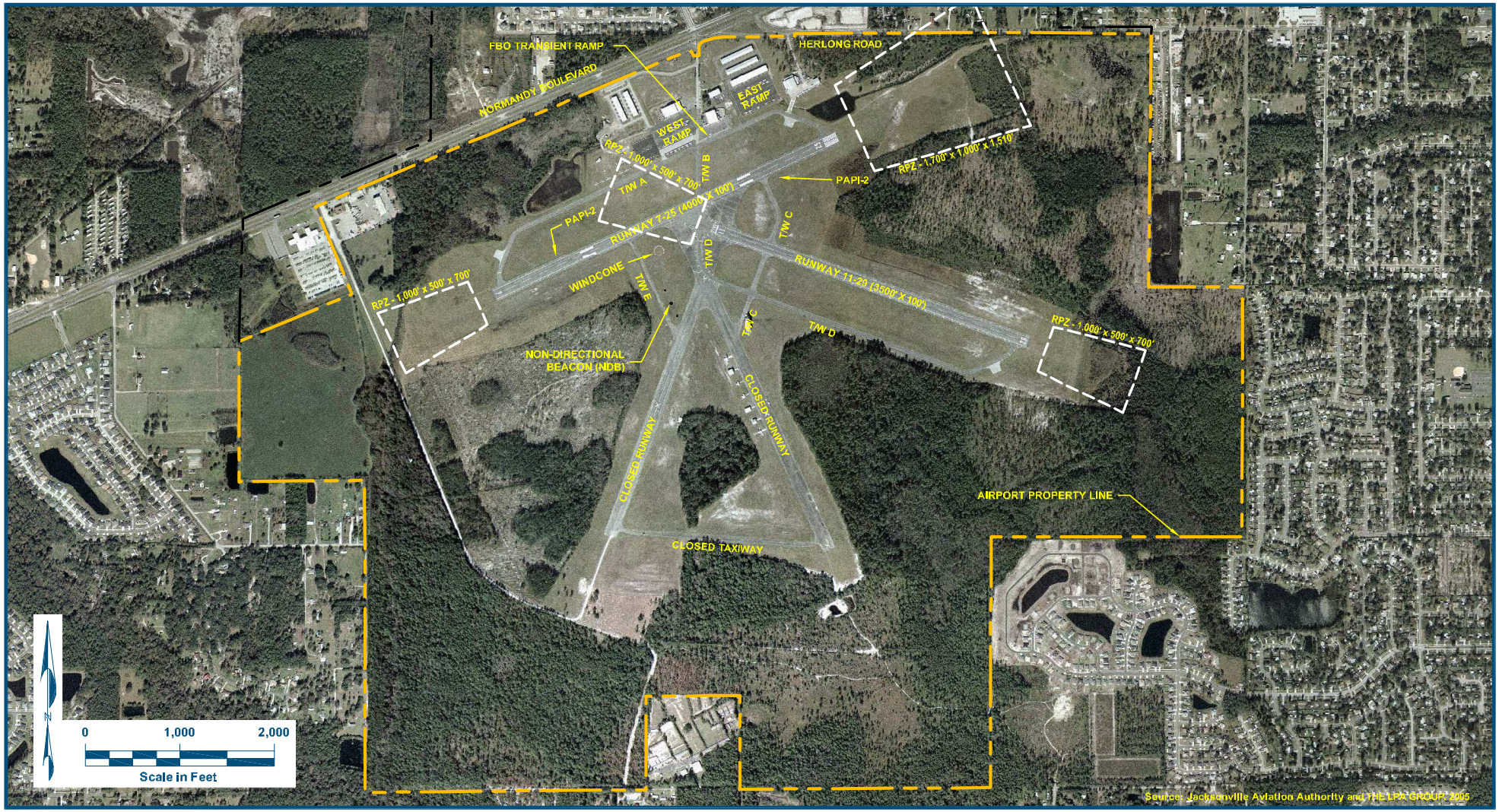


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Figure 2-12

A non-precision instrument approach procedure utilizing Global Positioning System (GPS) equipment is published for Runway 25 with visibility minimums as low as one mile. Since a GPS approach is based upon a system of satellites, no ground equipment for this non-precision approach is required.

The airport Non-Directional Beacon (NDB) is an antenna, which emits a low-to-medium frequency signal to en route and approaching aircraft. The NDB antenna at HEG is a two-tower antenna located approximately 600 feet south of Runway 7-25 and 300 feet west of closed runway 16-34. According to FAA Instrument Approach Plate data, dated January 2007 to February 15, 2007, the NDB approach is designated as a non-precision approach with the following approach visibility minimums:

- Aircraft Category A - One (1) Statute Mile Approach Visibility
- Aircraft Category B - One and one-quarter (1 1/4) Statute Mile Approach Visibility
- Aircraft Category C - One and one-half (1 1/2) Statute Mile Approach Visibility, and
- Aircraft Category D - Two (2) Statute Mile Approach Visibility.

Although an NDB approach is designated as a non-precision approach, it requires higher approach minima compared to a GPS or ILS non-precision approach. In addition, as a result of new technology, NDB approaches and equipment are being phase out of use by the FAA. Although the NDB at HEG is still is good working order, consideration in the mid to long-term should be given to replacing the equipment with newer technology.

Other visual aids at the Airport include a lighted wind cone and segmented circle located immediately north of the NDB antenna and a rotating beacon located near Normandy Boulevard west of the airport main entrance. An automated weather observing system is also situated on the airfield near the NDB antenna and provides local weather information to pilots.

Both Runways 7-25 and 11-29 are equipped with medium intensity runway lighting (MIRL). Runway edge lights are used to outline the edge of the runway during periods of darkness or restricted visibility conditions. Pilots must use the Unicom/CTAF frequency 123.0 in order to activate the MIRL and PAPI's at HEG.

Pilots en route to or from the Airport may use a Very High Frequency Omni-directional Range/Tactical Air Navigation (VORTAC) at Craig Airport, frequency 114.5, channel 92, located approximately 16 nautical miles northeast of HEG. In addition, a global positioning system (GPS) approach to Runway 25 is available for approach in less than visual flight rule (VFR) conditions. Weather minimums must be at least one-mile visibility and 600-foot ceilings to use this approach. Additional Airport information is available via the CTAF/Unicom frequency 123.0, AWOS frequency 119.275, ASOS at JAX (14 NM NE) and ASOS at Craig Airport (16 NM East), Jacksonville Approach Departure Control frequency 124.4, and/or Notice to Airmen (NOTAM) announcements.

RUNWAYS

The Airport has two non-parallel active runways, Runway 7-25 and Runway 11-29 and two closed runways as illustrated on **Figure 2-12,** *Existing Airfield.* It was reported in the previous Master Plan updated in 2000 that the operations on both runways are not considered independent despite the fact that they don't intersect. Therefore, for operational purposes, the runways are considered intersecting runways due to the limited separation and overlapping safety areas.

Runway 7-25

Runway 7-25 is the primary runway with a length of 4,000-feet and 100-feet in width as published in the Airport Facility Directory (AFD). Runway 7-25 is designated to accommodate aircraft meeting ARC B-II design criteria, and is marked for a non-precision approach. According to **FAA AC 150/5300-13, Change 10**, runways with an ARC B-II designation with not lower than ¾-statue mile approach visibility are required to have a Runway Safety Area (RSA) of 300-feet in width and an Object Free Area (OFA) of 500-feet in width, both, centered from the runway centerline. Both RSA and OFA require a length beyond the runway end of 300-feet.

The runway is made of asphalt and appears to be in good condition. Runway pavement should be capable of withstanding aircraft traffic that it is intended to serve. Therefore, pavement strength determines the maximum load bearing that the runway could sustain and is dependent on the aircraft's undercarriage configuration. There are three types of undercarriage configurations: single wheel, dual wheel, and dual wheel tandem. According to the FAA AFD, Runway 7-25 pavement has a maximum weight bearing capacity of 30,000 pounds for single wheel.

The 2000 MPU reported a discrepancy in the pavement strength for this runway when compared to the FAA Airport Facilities Directory (AFD) (2/24/00) and the 1994 MPU. The 1994 Master Plan listed the pavement strength at an estimated 21,600 pounds and the FAA AFD (2/24/00) listed the pavement strength at 30,000-pounds for single wheel gear (SWG). As a result, the 2000 MPU suggested that Airport management conduct a detailed assessment of the pavement strength on Runway 7-25. Thus, based upon JAA's assessment, it was determined that the pavement strength on Runway 7-25 was indeed 30,000-pounds for SWG. At the time of this writing, the FDOT has contracted the URS Corporation to provide a pavement evaluation for all public airport within the state.

Runway 11-29

Runway 11-29 is the shortest of both runways with a published length of 3,501-feet ft and 100-feet in width. With an ARC B-II designation, the same RSA and OFA standards as depicted above for Runway 7-25 are applicable to Runway 11-29. As illustrated in **Table 2-10**, there are also no issues associated with the required FAA RSA and OFA standards.

Runway 11-29 is also constructed of asphalt and reported to be in good condition from the last inspection. The pavement strength is listed in the FAA AFD with a weight bearing capacity of

30,000-pounds for single wheel. It is currently marked for a visual approach only, and pavement markings are in poor condition.

Because the wind criteria indicates that the alignment of Runway 7-25 provides 95 percent or better wind coverage in all weather conditions, the FAA does not provide any funding for Runway 11-29 or any supporting taxiways or lighting associated with that runway.

TAXIWAYS

Taxiways are provided to permit the safe and expeditious surface movement of aircraft to and from the runway and other facilities on the Airport. HEG is served by two parallel and two connecting taxiways. According to **AC 150/5300-13, Change 10**, taxiways serving airplanes in Airplane Design Group (ADG) II are required to have a taxiway width of 35-feet and a taxiway centerline to runway centerline separation distance of 240-feet. As stated in the AFD, all taxiways have pavement strengths of approximately 30,000-pounds for single wheel gear aircraft as comparable to the pavement strengths of the two runways. During the initial site visit in August 2005, all taxiways, with the exception of the taxiways and closed runways within the southern portion of the airfield, were reported to be in "fair to good" condition based upon FDOT pavement criteria. In addition, Taxiways A, B and C are equipped with low, medium and high intensity lighting systems.

Two closed runways and a closed taxiway are located south of the maintained airfield. These pavements are in poor condition, but are used by aircraft operating out of the hangars located on the south side of the airfield as well as skydiving and glider operations.

Taxiway A

Taxiway A is a parallel taxiway that serves Runway 7-25 and the general aviation facilities located on the north side of the airfield. As a primary taxiway serving a runway with an ARC B-II, Taxiway A has a width of 50-feet and a taxiway centerline to runway centerline distance of 500-feet. Both exceed applicable FAA standards. This taxiway is constructed of asphaltic concrete (asphalt) and is in fair condition based upon physical observations and FDOT pavement criteria. Since this taxiway supports Runway 7-25, FAA will provide funding for maintenance and improvements but only to a 35-foot width.

Taxiway B

Taxiway B is a stub taxiway with dimensions measuring 50-feet in width and approximately 500-feet in length. Since Taxiway B supports Runway 7-25, FAA will provide funding for maintenance and other improvements but only to a width of 35 feet based upon the critical aircraft requirements. Taxiway B, with the existing fillets, is located approximately 1,800-feet from the threshold end of Runway 25 and provides access to the general aviation facilities located north of the airfield. Based upon recent inspection and FDOT pavement criteria, pavement is in fair to good condition.

Taxiway C

Taxiway C provides access from the eastern end of Runway 7-25 to Runway 11-29, Taxiway D, and the closed runway pavements to the south of the airfield. Taxiway C is constructed of asphalt, and is in fair condition with a total width of 50-feet. Since a section of Taxiway C supports operations on Runway 7-25, the taxiway is considered eligible for FAA funding but only to a 35-foot width.

Taxiway D

Taxiway D is a full-length parallel taxiway that serves Runway 11-29. Taxiway D also exceeds applicable FAA design criteria with a width of 50-feet and a runway-taxiway separation of 500-feet between centerlines. The taxiway is constructed of asphalt and is in fair condition based upon physical observation and FDOT pavement criteria. Taxiway D at this time is not eligible for federal funding since it primarily supports operations on Runways 11-29.

Taxiway E

Taxiway E provides access from Runway 7-25 to the southwest closed runway. In order to provide an additional exit taxiway to the northwest GA area and access to future development in the southwest quadrant, JAA intends to rehabilitate the existing pavement and extend Taxiway E to connect with the existing Taxiway A. Until issues with the existing glider landing area are resolved, JAA has placed the Taxiway E extension on hold. The existing width of Taxiway E is 40 feet, which will serve B-II aircraft. The current pavement condition is considered fair to poor due to physical observations of pavement degradation.

AIRCRAFT APRON FACILITIES

Aircraft parking aprons are located within the general aviation terminal area as shown in **Figure 2-12,** *Existing Airfield.* Aircraft parking aprons are generally divided into two user categories, those for the station of based aircraft and the other for the temporary parking of itinerant aircraft. At HEG, the East and West aprons are used primarily for the parking of based aircraft, including the two large asphalt tie-down aprons. The East and West aprons measure approximately 15,000 square yards and 14,000 square yards, respectively and were reported to be in fair to good condition. Collectively, both aprons can accommodate 95 aircraft and they also provide direct access to neighboring hangar facilities.

Transient aircraft parking is provided on the FBO apron that is located south of the Airport terminal facility and one row on the west apron. The apron pavement is in relatively good condition. The transient apron measures approximately 3,100 square yards and can simultaneously accommodate approximately six (6) aircraft.

EXISTING LANDSIDE FACILITIES

The majority of landside facilities at HEG are located north of the airfield adjacent to Normandy Boulevard. Landside facilities consist of a mix of aviation and non-aviation facilities, including the remodeled terminal, fuel storage, automobile parking and various tenant facilities.

Aviation related facilities, which are dependent upon direct airfield access, are constructed adjacent to airport aprons and taxiways. Non-aviation related facilities, such as vehicle parking, are located further north adjacent to Normandy Boulevard and Herlong Roads.

LAND USE

A majority of the aviation activity is centered on the northside of the airfield. This area adjacent to Normandy Boulevard includes the Airport's main entrance, tenant and Airport management facilities, fueling facilities, housing for JAA airport police, and the majority of aircraft storage hangars and facilities. In addition, most of the airport tenants and tenant facilities are located adjacent to the terminal area, which is comprised of aviation related properties north of Runway 7-25 and parallel to Taxiway A. However, some non-aviation operations include facility rentals within the bulk hangar and office spaces on the west side of the Airport Entrance Road. Interest from non-aviation businesses in the Airport may allow for the development of a commerce park. This would allow non-aviation businesses to be relocated to facilities not adjacent to the Airport operating area, therefore providing more space for aviation related activities.

The existing airfield is surrounded by undeveloped tracts of Airport property, which provide a buffer between the airfield and residential communities surrounding the Airport. These areas are used for silviculture according to the JAA Forest Management Plan which includes cutting trees to generate revenue in support of airport operations and replanting trees for future revenue generation.

Existing On-Airport Land Use

Existing on-airport land use consists of the following categories:

- Airfield Operational Areas (AOA) - include runways, taxiways, and other facilities that aid in the movement of aircraft.
- Terminal Area – includes aircraft hangars, aircraft parking aprons, aircraft fueling facilities and aviation related tenant facilities directly relating to aircraft activity.
- Non-Aviation Related Development – includes the non-aviation related commercial development located adjacent to Normandy Boulevard and west of the Airport Access Road.
- Drainage – includes areas reserved for permitted drainage and stormwater management, such as man-made or natural ponds, swells or drainage ditches.
- Wooded Area/Open Space – includes cleared and undeveloped airport property located along the southern and eastern part of the airfield that is currently underutilized by airport management. This area primarily serves as a buffer between the airport and residential neighborhoods and the Gateway Rifle and Pistol Club as well as providing an additional source of revenue associated with tree harvesting.

Off-Airport Land Use and Controls

Land use adjacent to the airport includes residential development north, east and west of the airfield as shown in **Figure 2-13**, City of Jacksonville *Land Use Map*. Typically residential development adjacent to an airport unless related to a "fly-in" community is often limited to property outside the 65 LDB noise contour. In the case of HEG all residential activity is located outside the 65 LDN noise contours and is, therefore, not impacted by airport operations. In addition, the Airport is bordered on the south by the Gateway Rifle and Pistol Club, which is located on a 22.5 acre out-parcel south of the Airport fenceline.

In 1978, the City of Jacksonville established an Air Installation Compatible Use Zones (AICUZ) Ordinance as shown in **Figure 2-14**, *City of Jacksonville Air Installation Compatible Use Zones*, to preserve public investment as well as protect the public's safety and health. This ordinance objective is to provide protection for planned airport operational capabilities as well as ensure compatible development. Zoning regulations within the AICUZ are contained in Part 10 of the city of Jacksonville Zoning Code.

At the time of this writing, significant residential development is occurring in the western quadrant of the City of Jacksonville, including north of Normandy Boulevard across from the Airport Entrance Road. Although residential development is on-going, based upon 2006 property title data, JAA has an avigation easement over some of this property as shown in **Figure 2-15**, *North Avigation Easement*. This will be discussed in more detail within later chapters of this report. In order to ensure land use compatibility as outlined in the FAA Land Use Guidelines, **AC 150/5050-6** *Airport Land Use and Compatibility Planning*, adjacent land use and zoning issues will need to be addressed as part of this MPU.

FBO TERMINAL FACILITIES

A building condition survey performed in October 2000, determined that the Herlong Terminal/Hangar and the associated offices were in fair to good condition. The existing terminal facility was renovated in 2001 to add more pilot amenities, and is, therefore, now considered in good condition.

The Terminal Building provides a pilot lounge, two conference rooms, restrooms, kitchen, and office facilities for Airport and Fixed Based Operator (FBO) staff. JAA serves as the Fixed Base Operator at Herlong. The FBO provides airport terminal, hangar space, tie-down areas, and fueling facilities at the airport. In addition, the FBO staff, including airport management, is responsible for airport inspection and maintenance, security, and overall operational control.

JACKSONVILLE AVIATION AUTHORITY

City of Jacksonville Land Use Map

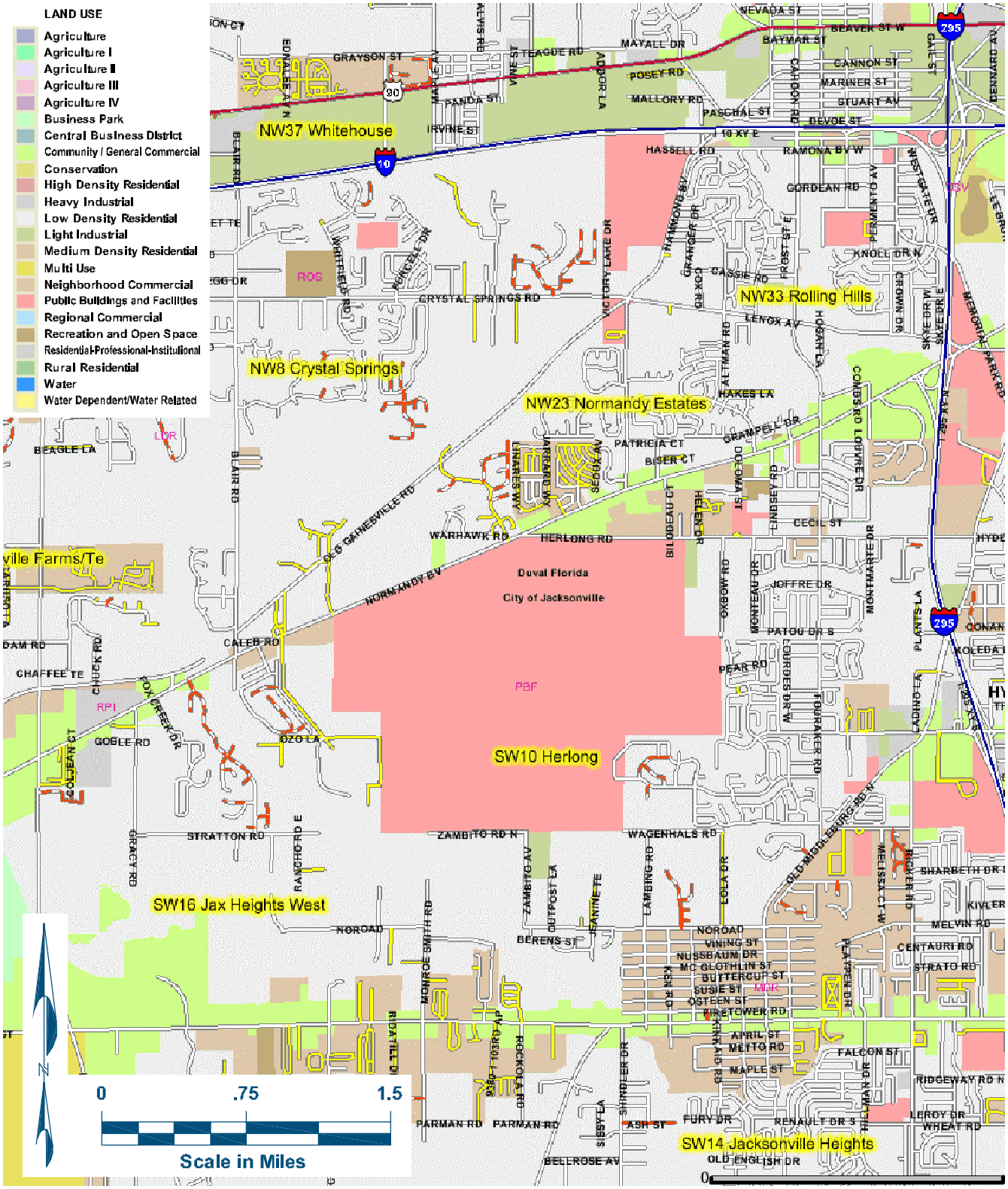

Figure 2-13

JACKSONVILLE AVIATION AUTHORITY

City of Jacksonville Air Installation Compatible Use Zones (AICUZ)

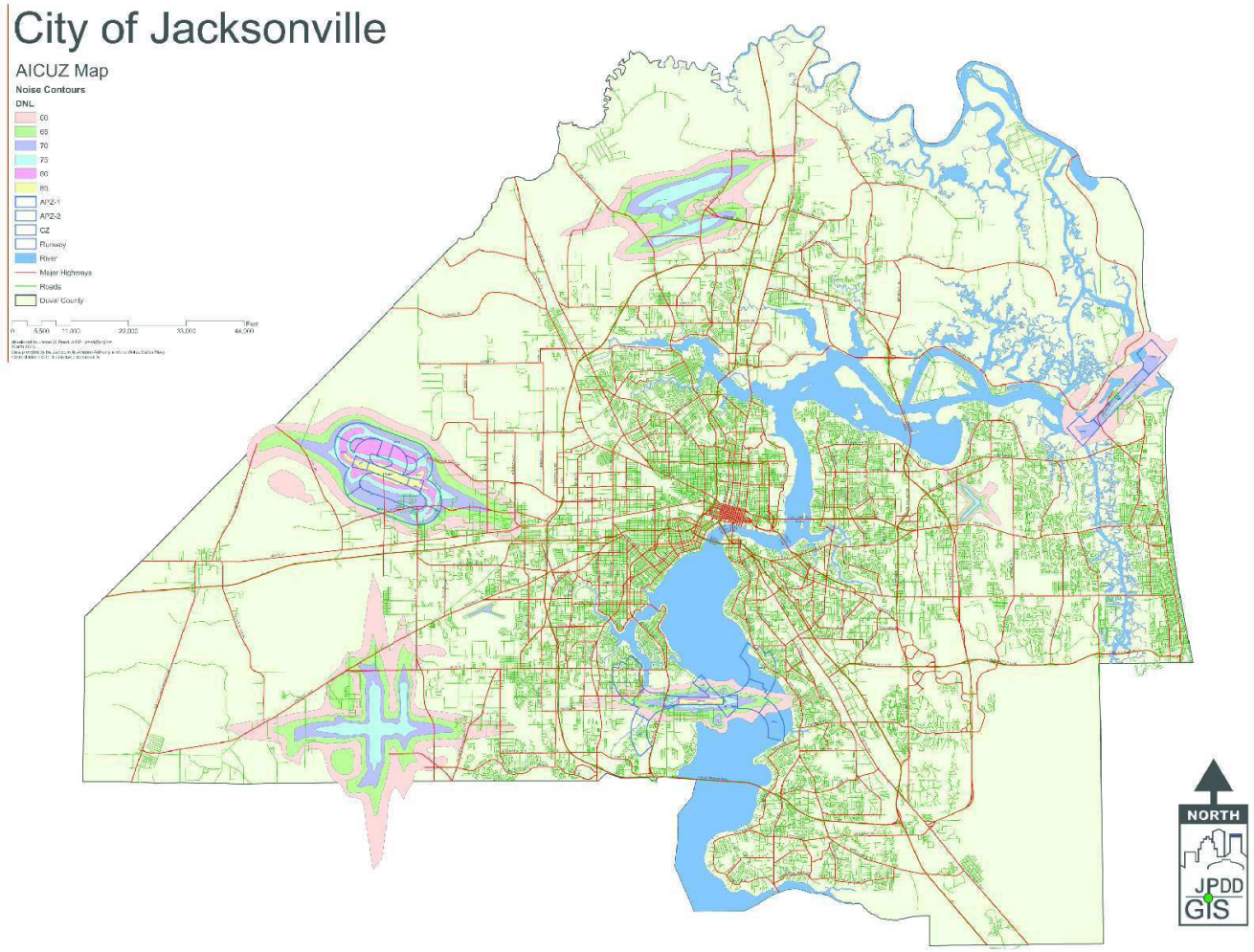

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Figure 2-14

JACKSONVILLE AVIATION AUTHORITY

North Avigation Easement

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Figure 2-15

SURFACE TRANSPORTATION NETWORK

U.S. Interstate 10 (I-10), Interstate 95 (I-95) and Interstate 295 (I-295) provide regional access to the Airport. I-10 runs in an east – west direction and merges into I-95 at its most eastern portion. The I-10 corridor is located north of the Airport and south of the Jacksonville Business district. I-95 runs in a north-south direction. The I-95 corridor is located to the east of the airport location. I-295 is an eastern loop that runs in a north-south direction. I-295 intersects I-10, provides access to the Jacksonville Business district and reconnects to I-95. The Airport is located approximately 3 miles southwest of the intersection of I-10 and I-295.

Normandy Boulevard (Highway 228), the primary highway and arterial access to the HEG, is located north of the Airport, and connects the main airport entrance directly to I-295. I-295 connects directionally with I-10 and I-95. Normandy Boulevard is a 2-lane, divided highway that runs east west. Herlong Road is a two-lane road intersecting Normandy Boulevard approximately one mile east of the Airport. Herlong Road is bordered by residential development and provides access to the western section of the airport.

AUTOMOBILE PARKING

Public parking at the Airport includes parking areas located along the east and west edges of the airport entrance road, adjacent to the new bulk hangar to the west of the entrance road and another parking area to the north of the new T-Hangar facilities along the northwest side of the airfield. Access to all of these parking facilities is through the main access road along Normandy Boulevard. The majority of automobile parking is located outside the perimeter fenceline with the exception of five parking spaces located within the perimeter fence adjacent to the terminal facility.

28 parking spaces along the east edge of the Airport Road and seven spaces along the west edge of the entrance road serve as the primary parking facility for many of the airport tenants and visitors. However, the use of this parking area often delays vehicles entering or exiting the secure area via Gate 1. This is especially true during peak days of the week (usually Saturday) and special events, where parking both inside and outside the perimeter fence is inadequate to meet demand. Airport users who have automobile access to the airfield often park on the ramp and above the underground fuel tanks due to lack of adequate parking.

On the other hand, during visits to the Airport, the parking facilities adjacent to the T-Hangars are not used to any significant degree. This may be due to the fact that many T-hangar users often park their vehicles inside their hangar. This demonstrates that HEG does not lack adequate parking to meet current demand, but rather that the location of automobile parking on the airport is inadequate. An evaluation of automobile parking including the location and the number of facilities needed, will be evaluated in greater detail in the Demand Capacity and Facility Requirements Chapter. An approximate number of parking spaces available are listed in **Table 2-6**, *Existing Automobile Facilities*.

TABLE 2-6 EXISTING AUTOMOBILE FACILITIES AVIATION RELATED ONLY	
LOCATION	**NUMBER OF SPACES**
Outside Perimeter Fenceline	
West Side of Entrance Road	7
East Side of Entrance Road	28
North of new T-hangar Facilities	25
Adjacent to Bulk Hangar	46
Inside Perimeter Fenceline	
Adjacent to Terminal Facilities	5
TOTAL	**111**
Source: JAA and The LPA Group Incorporated, 2005	

Individual airport tenants and airport buildings, such as White Line Trucking and the Accessory Overhaul Group, which are not located near the Terminal Building have their own individual parking facilities.

AIRCRAFT FACILITIES

As stated earlier, the majority of aircraft storage and operating facilities are located along the north side of the airfield adjacent to Normandy Boulevard and Herlong Road. This is primarily due to ease of access to facilities and lack of utilities available on the southern and western portion of the airport property.

T-Hangar Facilities

The primary type of aircraft storage at HEG consists of T-Hangar facilities. Three rows of T-Hangars (approximately 48 units) are located northeast of the terminal facility. Two of the three hangars measure 356 feet in length and house 16 units each. The third T-Hangar is 412 feet in length and provides 16 larger hangars.

An additional two rows of T-Hangars (approximately 24 units) was constructed on the west side of the airfield south of Normandy Boulevard and west of the bulk hangar. All hangars are owned and operated by JAA and are leased to individual aircraft owners.

Tenant Facilities

In addition to the airport terminal facility and T-Hangar facilities, JAA recently constructed a 20,400 SF bulk hangar, which is occupied by several aviation and non-aviation tenants and housing several aircraft. These facilities and associated tie-down spaces are leased directly by JAA. Typical aircraft include single-engine piston, ultralights and gliders.

HEG is host to a diverse group of tenants including business which offer flight training, avionics sales and services, aircraft sales, thrill rides, skydiving and motorcycle training operations. Current airport tenants include:

- A&M Motorcycle
- ACME Barricades
- Advanced Disposal
- Butch Toney
- Dream Catcher Aviation
- First Coast Aircraft Sales
- Hipps Group, Inc.
- Jacksonville Navy Flying Club
- Mercair
- NFL Soaring Society
- NFL Flight Center
- RC Worldjet, Inc.
- Royal Atlantic Aviation
- Skydive Jacksonville

In addition to various aviation and non-aviation tenants, the Jacksonville Aviation Authority Police Department (JAA Police) leases and maintains a living quarters trailer immediately north of the airport terminal building. The airport also leases small portions of property along the west edge of the closed runway along the south side of the airfield to individual tenants. Two portable style hangars are located along the west apron and three separate individual hangar facilities are located south of the port-a-port hangars. None of these hangars have direct vehicular access, and, therefore, must traverse the airfield to gain access to their respective hangars.

Off Airport Facilities

The Florida Army National Guard operates an approximate 4.05-acre complex near the northwest corner of the airport property south of Normandy Boulevard. This non-airport facility is used for non-aviation operations and provides no direct access to the airfield. However, members of the National Guard utilize the southern portion of the airfield including closed runways for physical training every morning.

SUPPORT FACILITIES

Support Facilities ensure the efficient and safe operation of aircraft at HEG. These services include the Fixed Based Operator (FBO), police, fueling services and airport maintenance which all serve a key role in the support of the airport and its operations.

FIXED BASE OPERATOR

JAA serves as the FBO at Herlong by providing aviation services for general aviation aircraft and flight crews. These include terminal facilities for pilots, hangar space, tie-downs and fueling. As recommended in the last MPU, JAA recently constructed 24 new individual T-Hangar facilities south of Normandy Boulevard to meet aircraft owner demands.

JAA Flight Services offices are located in the refurbished terminal building. The FBO provides competitive prices for both aircraft storage and 100 low lead (LL) and Jet A fuel. A detailed discussion concerning the management of the FBO and Airport will be included in **Chapter 4**, *Facility Requirements*.

FUEL FACILITIES

The current airport fuel system is located immediately west of the terminal building and adjacent to the main entrance of the Airport. Fuel distribution is provided by JAA, which is the local FBO. Two underground fuel storage tanks consisting of one 15,000 gallon capacity for Jet A and one 15,000 gallon capacity for Avgas provide fuel at the Airport. It is the intent of JAA to relocate these facilities above ground by the year 2009 to comply with the Revised Spill Prevention, Control and Countermeasure Rule as outlined in Title 40 Code of Federal Regulations (CFR) Part 112 (Oil Pollution Prevention). There are two fuel trucks at the Airport that provide 8,000 gallons Avgas and 1,200 gallons Jet A for aircraft curbside fueling service. It is the intent of JAA to relocate these facilities above ground by the year 2009.

Waste products associated with the fuel storage area are typically placed in drums which are stored in a small storage shed located west of the terminal and are disposed properly on an as needed basis.

Self Service Fueling

A self-storage fueling station was constructed in 2002 in the area between the East Apron and the FBO Transient Apron. This station provides Avgas through a self-service pump and payment kiosk, which allows aircraft operators to have 24-hour access to fuel at the Airport. This self-fueling facility consists of a 1,500-gallon, above ground storage tank located beyond the Taxiway A object free area (OFA).

SECURITY

In the aftermath of September 11, 2001, airport security came under intense scrutiny. Historically, GA airports have not been high-security facilities, and the federal government has not, to date, regulated GA airport security as it has done with commercial service airports. The main terrorist threat at GA airports is the possible theft or hijacking of aircraft for use as terrorist weapons.

In May 2004, a report entitled, "Recommended Security Guidelines related to General Aviation Airports" was developed by State Aviation Officials from the continental United States, Puerto Rico and Guam. The report provides advice, recommendations and guidance to federal authorities for developing a national policy as well as appropriate standards of airport security for public-use general

aviation airports. As a result, the FDOT in conjunction with the FAA is recommending the following best practices to general aviation airports throughout the State. These practices include:

- Establishing security criteria at GA Airports based upon the airport's location, runway length, and number of based aircraft. According to the criteria outlined in the report, HEG is designated as a **Category 2 Airport**, which is defined as an "airport located within a major metropolitan area with a runway length of 4,001 feet or greater and/or 200 or more based aircraft".
- It is recommended that all public GA airports prepare a comprehensive airport security plan, which would be subject to periodic review and approval by both the TSA and FDOT.
- It is recommended that all public GA airports install adequate outdoor area lighting to improve the security in and around: (a) aircraft parking and hangar areas, (b) fuel storage areas, and (c) access points to the aircraft operations area.
- Criminal record background checks should be required on all airport, fixed base operator (FBO) and airport tenant employees with access to the aircraft operations area (AOA). Criteria similar to that used in FAR Part 107 should be developed and approved by FDOT to determine what offenses would disqualify individuals from being granted access.
- All GA airports require security fencing to help prevent unauthorized access to the aircraft operations area, fuel facilities, and other sensitive areas.
- All GA airports are required to install signage around the AOA, fuel facilities, and other sensitive areas to deter unauthorized entry.

However, it is important to note that under the current rules, security-related expenses at GA airports are not usually eligible for funding under the FAA Airport Improvement Program (AIP), but may receive a portion of funding from the FDOT. However, based upon the existing and anticipated threat level, the ability of GA airports to implement various recommendations will be contingent upon the identification of necessary funding to finance the projects.

Furthermore, FDOT has implemented an aviation security test project, referred to as the Integrated General Aviation Airport Security System (IGASS) Demonstration Project, which evaluates potential threats as well as general aviation operations at airports of various size and level of operations throughout the state of Florida. Based upon the findings of this study, FDOT in conjunction with the FAA and TSA will implement various security requirements.

Current security equipment and facilities located at HEG consist of the following:

JAA Police Trailer

On-airport security consists of a JAA Police trailer located immediately north of the terminal facility. The trailer is currently used as a residence by JAA Police staff and its conspicuous location near the airport's main entrance provide adequate security near the primary airfield facilities.

Security Lighting

The previous MPU recommended that additional lighting be added to the terminal area in order to assist users unfamiliar with the Airport and increase safety and security for terminal area activities. As a result, two lighted 15 to 20 foot poles with 4 lights each was constructed on either side of the Bulk Hangar facility, providing a significant amount of light to the terminal apron area and automobile parking area adjacent to the facility. Additional lighting was added to the terminal building when it was refurbished and to the apron area adjacent to the aircraft wash rack and self-fueling facility. All lighting complies with FAR Part 77 imaginary surface limitations and all other applicable airport design requirements.

Security Fence

The existing Airport perimeter fence encompasses the airfield and all aircraft movement areas. Access gates at the FBO facilities and throughout the fence provide adequate vehicular and pedestrian access.

In 2003 and 2004, the Airport refurbished portions of the existing fence to prevent unauthorized access into the Airport. A portion of the southwest section of the Airport was not fenced due to forested wetlands, which has allowed limited access by local wildlife. With the acceptance of new GA security regulations, security improvements at the Airport will be considered in order to limit unauthorized access by both wildlife and local residents.

AIRCRAFT WASHRACK

An aircraft washrack located at the eastern side of the terminal facility aircraft hangar is provided for airport tenants and users. The washrack consists of a hose and storm drain. The storm drain collects stormwater runoff and aircraft wash runoff. A valve located along the terminal hangar must be manually opened during aircraft washing activities to divert associated runoff in a separate collection system. This prevents oil and grease from entering the Airport's general stormwater system. The collection system aircraft wash runoff is periodically pumped for proper disposal.

AIRCRAFT RESCUE AND FIRE FIGHTING FACILITIES

Aircraft rescue and fire fighting services at HEG is provided by Jacksonville Fire and Rescue (JFRD). JFRD responds to all aircraft and structural emergencies on or off airport. Brush and Rescue Station 32 is the first to respond to an aircraft incident. At least five gates, three along Normandy and two along Herlong Road, provide access to the airfield. Station 32 is located within two miles from the airport. Response to an aircraft incident consists of two brush trucks, five engines, one safety truck, two tankers and JFRD Hazardous Response Team in addition to Sheriff, FAA and JAA personnel. On-airport safety equipment consists of fire extinguishers, which are inspected annually and maintained by local vendors.

PUBLIC UTILITIES

JEA provides Herlong Airport with electrical, water and sewer services. Water service is delivered to the airport through a water main that runs along Normandy Boulevard. JEA's water treatment plant provides potable water, and their wastewater treatment plan provides sewer treatment services to HEG. Water and sewer lines run to each hangar on the north side of the airfield.

Facilities located on the south side of the airfield adjacent to the closed runways do not have electricity, water and sewer access. Utility improvements will be considered as part of this MPU.

STORMWATER DRAINAGE

A number of areas have been identified to accommodate additional drainage requirements at the Airport. Existing drainage facilities are located along the South Airfield Access Road, East Airfield Access Road, and the realigned airport entrance road.

The existing retention/detention facility located north of Taxiway A was reportedly sized to accommodate build-out of the airport property north of the Runway 7-25 centerline. Additional stormwater management facilities will need to be constructed to accommodate any increase in impervious surface in this region between recommended airport improvement and the previous plan.

Future stormwater management facilities should be designed to minimize wildlife attractants and reduce the frequency and risk of aircraft-wildlife collisions. Since the collection of stormwater runoff for off airport disposal is cost prohibitive, JAA has used remote portions of the Airport's existing property for stormwater mitigation.

EXISTING ENVIRONMENTAL CONDITIONS

The following sections provide a summary of the results of the literature review and preliminary environmental survey of the existing natural features within the Airport.

WATER QUALITY

The FDEP, Division of Water Resource Management (DWRM), monitors water quality statewide in association with the administration of various programs to protect Florida's drinking water, groundwater, and surface waters. DWRM monitors 29 surface water basins within the State. Herlong Airport falls within the Ortega River Planning Unit of the Lower St. Johns Basin. Stormwater leaving the Airport flows into tributaries of Wills Branch to the east and McGirts Creek to the west. Wills Branch has been documented to suffer impairment as evidenced by elevated levels of fecal coliform bacteria, copper, total suspended solids, nutrients, and turbidity. Wills Branch is also documented to have less than optimal levels of dissolved oxygen. Impairment to McGirts Creek is evidenced by elevated levels of fecal coliform bacteria.

Based upon existing information and an overview by the consultant's environmental scientists, it is not believed that HEG contributes to the impairment of either Wills Branch or McGirts Creek. However, a definitive answer cannot be obtained until a water quality analysis is performed which is typically included as part of the environmental assessment process.

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

A review of archaeological and historical literature and records pertaining to the Airport area was conducted in August 2005. Based on the results of this research effort, there are no recorded archaeological sites and no historic resources within or adjacent to Airport property. Therefore, no known cultural resources that are listed, determined eligible, or considered potentially eligible for listing in the National Register of Historic Places are located within the Airport boundary.

A site location predictive model was also employed in an effort to evaluate the probability for undocumented prehistoric site occurrences on Airport property. The model examined variables including soil drainage, distance to fresh water, topography, and proximity to resources such as food, stone, and clay. The investigator concluded that the Airport property was considered to have a generally low probability for prehistoric period site occurrence.

In addition, based on the results of the cultural resources record search, no historic structures are recorded within or adjacent to the Airport, and there is no potential for undocumented historic structures on Airport property.

BIOTIC COMMUNITIES

The SJRWMD classified the existing land use and cover in Duval County according to the Florida Land Use, Cover, and Forms Classification System (FLUCFCS) (**Figure 2-16**). A field survey was conducted on August 22, 2005 to verify the land use and land cover designations assigned by the FLUCFCS mapping for the Airport area. For the purposes of this study, field verified FLUCFCS (2005) and SJRWMD FLUCFCS (2000) data were used to identify the biotic communities and land use types that are within the existing Airport property boundary. Based on the 2000 SJRWMD data (**Figure 2-13**), FLUCFCS types that are present on Airport property include:

- Other light industrial (1550)
- Improved pastures (2110)
- Unimproved pastures (2120)
- Shrub and brushland (3200)
- Mixed upland nonforested (3300)
- Pine flatwoods (4110)
- Upland mixed coniferous/hardwood (4340)
- Reservoirs - pits, retention ponds, dams (5300)
- Bay swamp (6110)
- Mixed wetland hardwoods (6170)
- Cypress (6210)
- Hydric pine flatwoods (6250)
- Wetland forested mixed (6300)
- Freshwater marshes (6410)
- Wet prairies (6430)
- Mixed scrub-shrub wetland (6460)
- Airports (8110)

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SJRWMD FLUCFCS MAP

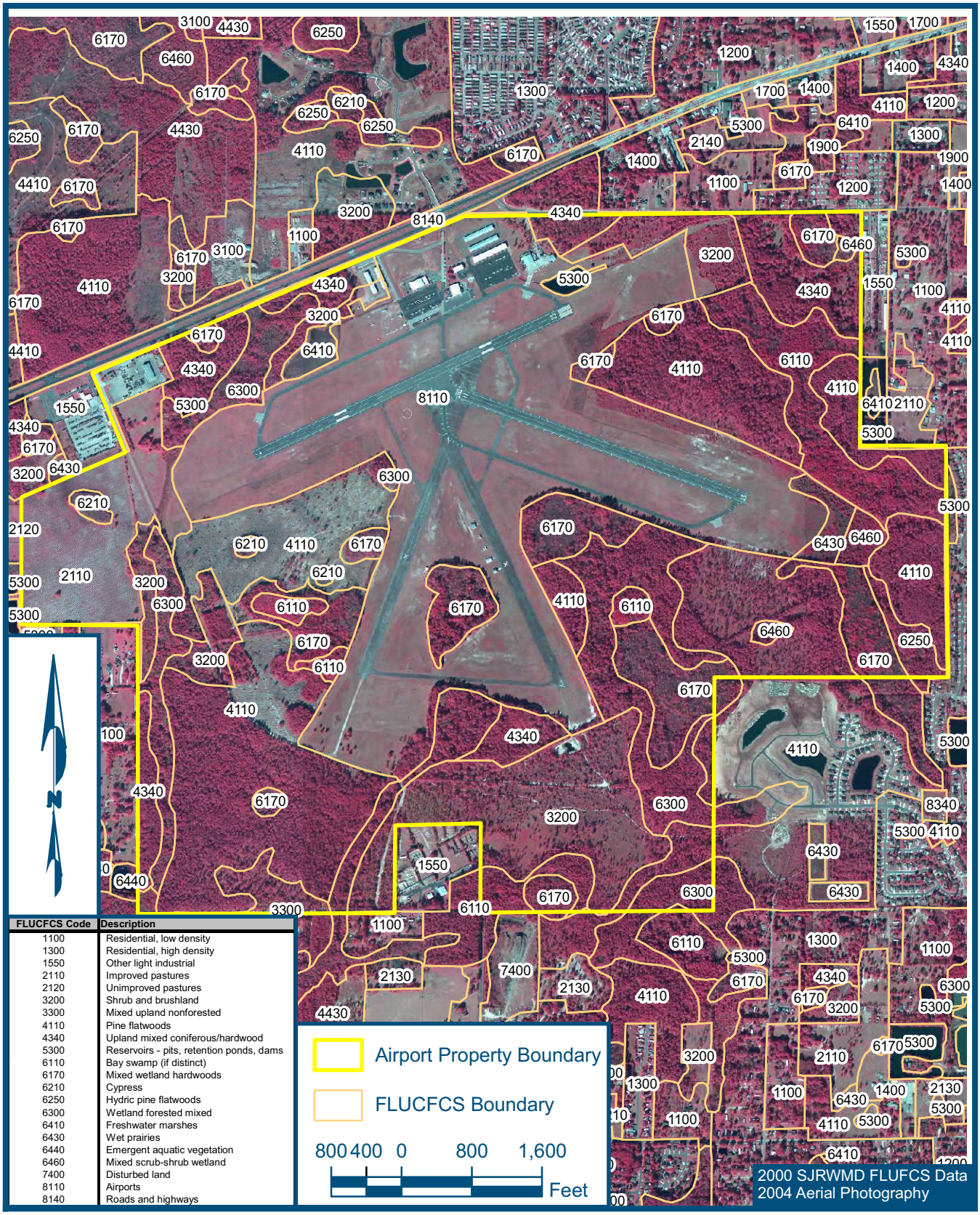

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Figure 2-16

The field survey of the Airport property area verified that the 2000 SJRWMD FLUCFCS data was reasonably accurate for the majority of the Airport property area. However, there were some notable differences between the 2000 FLUCFCS data and the conditions that were observed during the survey of the Airport property. The majority of these differences were due to silvicultural activities consistent with the Airport's Forest Management Plan that occurred subsequent to the 2000 SJRWMD FLUCFCS analysis of the area. The 2000 FLUCFCS data identifies an area in the northwest corner of the Airport Property as one relatively large tract of upland mixed coniferous/hardwood and the adjacent areas as mixed wetland hardwoods and mixed scrub-shrub wetlands. Based on field observations, trees were harvested in this area. The upland sections are regenerating with pine seedlings and various herbaceous species and the wetland sections are regenerating with mixed scrub shrub and emergent aquatic vegetation.

Some of the land cover south of Runway 7 and west of the closed runway in the southwest portion of the airfield was also reclassified due to silvicultural activities. The areas north of the Airport Perimeter Road, mapped by FLUCFCS (2000) as pine flatwoods, have been clearcut and are now regenerating with pine. An area located west of the perimeter road, on the east side of a former agricultural field on the west side of the Airport property is mapped as shrub and brushland on the FLUCFCS (2000) mapping, but based on field observations appeared to be predominantly mixed coniferous/hardwood uplands. However, more detailed survey and wetland mapping will be required for construction of specific projects proposed in the Master Plan at the time of project design.

ENDANGERED AND THREATENED SPECIES

Available GIS maps and literature were compiled and reviewed to determine the types of plant communities and wildlife occurrences that have been previously documented within the project study area. Data sources used in this evaluation included:

- FFWCC's 1999 Bald Eagle Nesting Territory Locations and Activity Status **(Figure 2-17);**
- FFWCC's Wading Bird Colony Locations **(Figure 2-18);**
- FFWCC Wood Stork Colony Locations **(Figure 2-19)**
- FNAI (Florida Natural Areas Inventory) Matrix of Habitat and Distribution of Rare/Endangered Species for Duval County **(Figure 2-20)**;

Listed fauna that may potentially occur at the Airport can be found below in **Table 2-7** and listed flora that may potentially occur can be found in **Table 2-8**.

Based on a review of FNAI element occurrence data, no state or federally listed plant or animal species are documented to occur within the Airport, and no suitable habitats for state or federally listed plants are documented to be present in the vicinity of the Airport.

FFWCC bald eagle nest location data **(Figure 2-17)**, wading bird colony location data **(Figure 2-18)**, and wood stork colony location data **(Figure 2-19)** also indicate that none of these species is documented to nest within the immediate vicinity of the Airport. The nearest bald eagle nest is

approximately 5.46 miles southeast of the Airport, which is significantly more distant than the USFWS recommended 1,500-foot radius secondary nest buffer protection zone. The nearest wading bird colony that does not contain wood stork nests is located approximately 6.75 miles south of the Airport. The nearest wood stork colony is located approximately 20.94 miles east of the Airport, which is outside the 18-mile radius wood stork colony core foraging area.

An environmental site visit was performed on August 22, 2005. During the visit, a gopher tortoise (*Gopherus polyphemus*), a species of special concern in the State of Florida, was observed just outside of the perimeter fence on the south side of the closed taxiway between the closed runways on the south side of the Airport property. An additional gopher tortoise was observed on a dirt road south of this area. A gopher tortoise carcass was also observed on the northern edge of the eastern RPZ for Runway 7/25.

Gopher Tortoise mitigation would only be required if new construction takes place in an area with gopher tortoise burrows. During the initial EO survey, no gopher tortoises or their burrows were found near any of the active or closed runways. The closest sign was a gopher tortoise carcass found in a ditch near the approach end of Runway 25. All other evidence of gopher tortoises was found outside the perimeter fenceline. However, since the consultant's environmental team did not examine the entire airfield, it is not possible to definitively state that there are no burrows within the airport property. It is important to note that any new construction will require a gopher tortoise survey of the impacted area(s) as part of the environmental assessment and permitting process.

Marginally suitable to suitable habitats exist on or near the Airport for other listed animal and plant species that appear on the USFWS and/or the FNAI lists for Duval County. Therefore, there is low to moderate potential occurrence of other listed plants and animals within the Airport based upon the initial field work completed as part of the Environmental Overview (EO) process. An in-depth review and survey will be conducted as part of the environmental assessment and permitting process if required.

JACKSONVILLE AVIATION AUTHORITY

FFWCC EAGLE NEST LOCATIONS

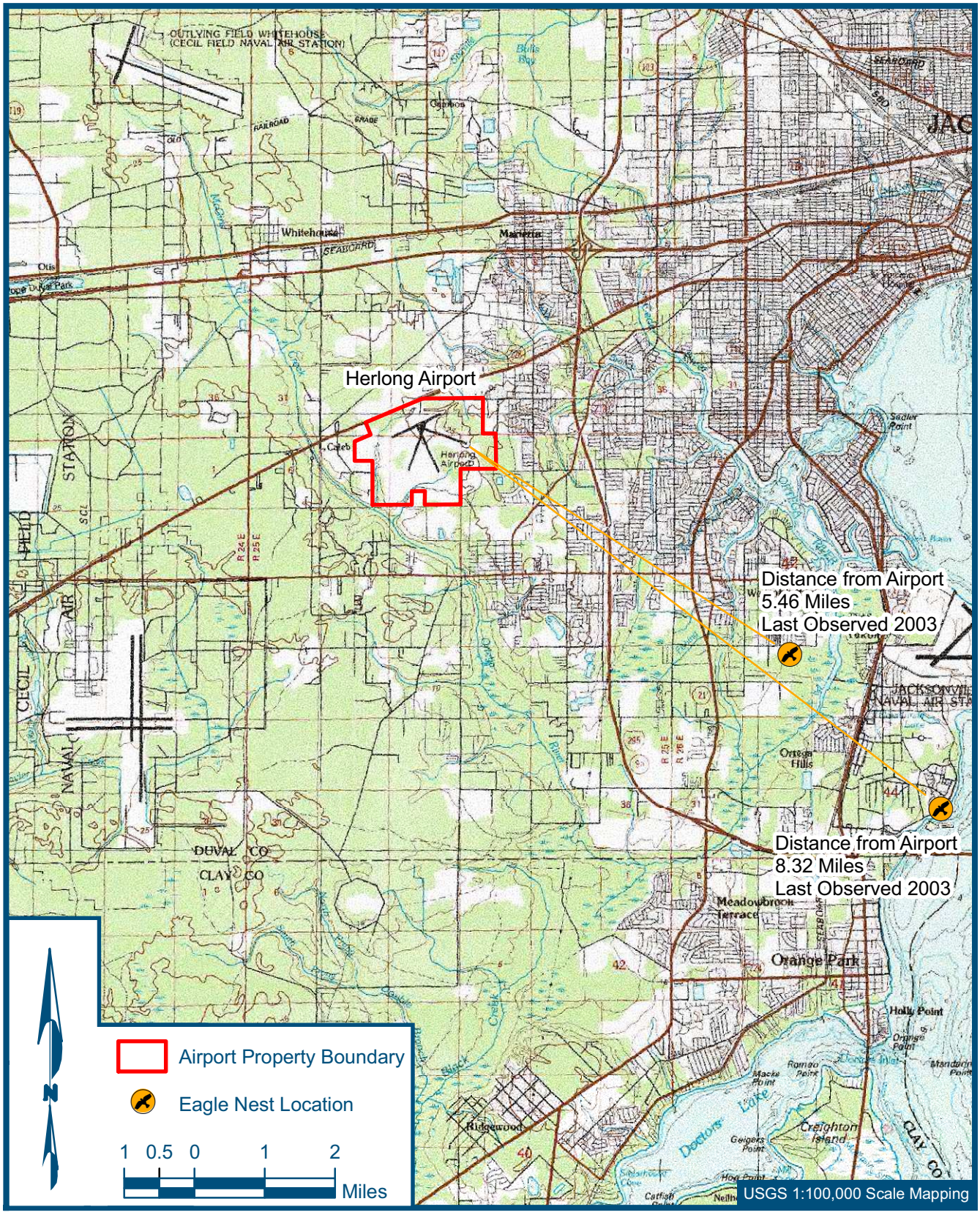

Figure 2-17

JACKSONVILLE AVIATION AUTHORITY

FFWCC WADING BIRD COLONY LOCATIONS

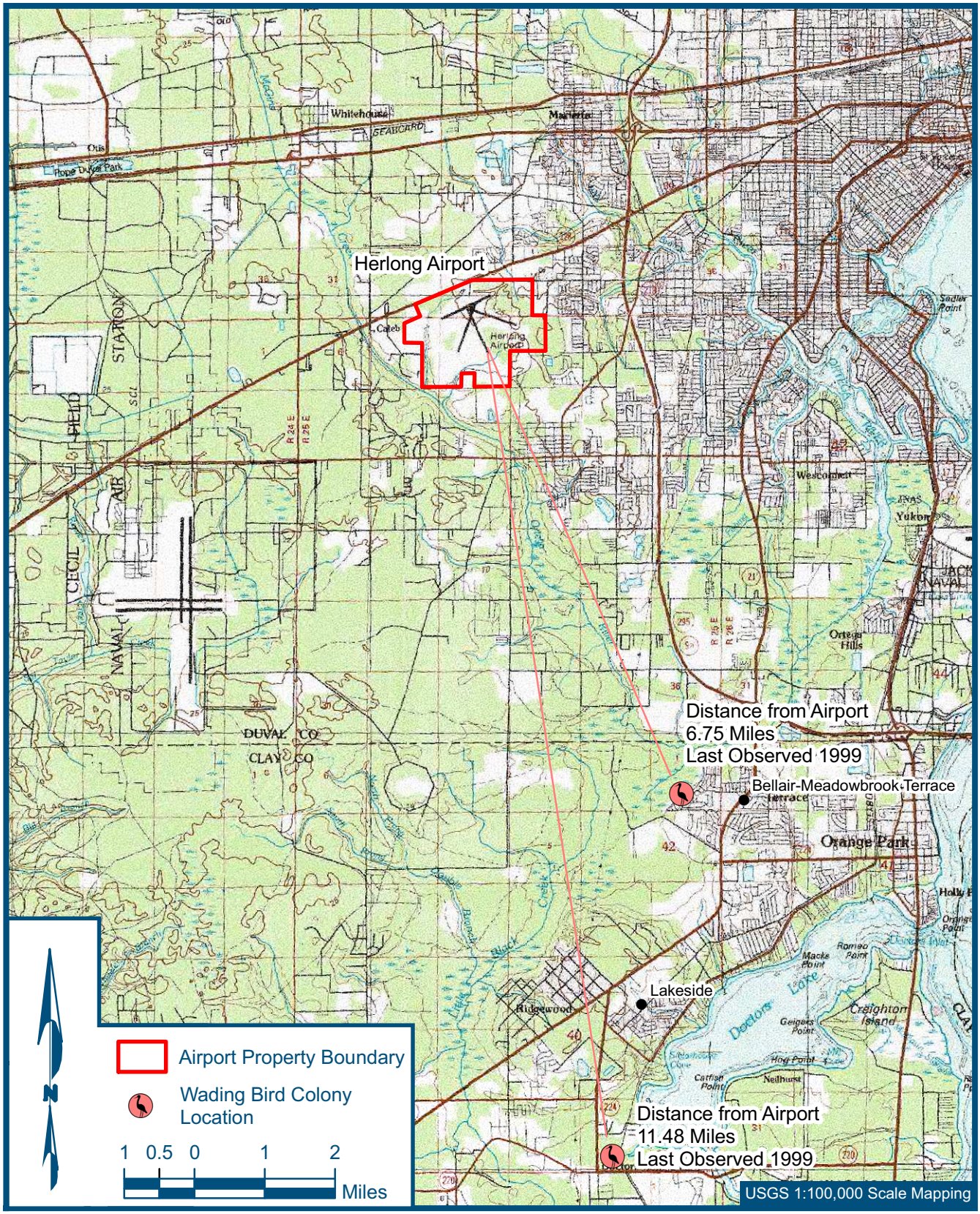

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Figure 2-18

JACKSONVILLE AVIATION AUTHORITY

FFWCC WOOD STORK COLONY LOCATIONS

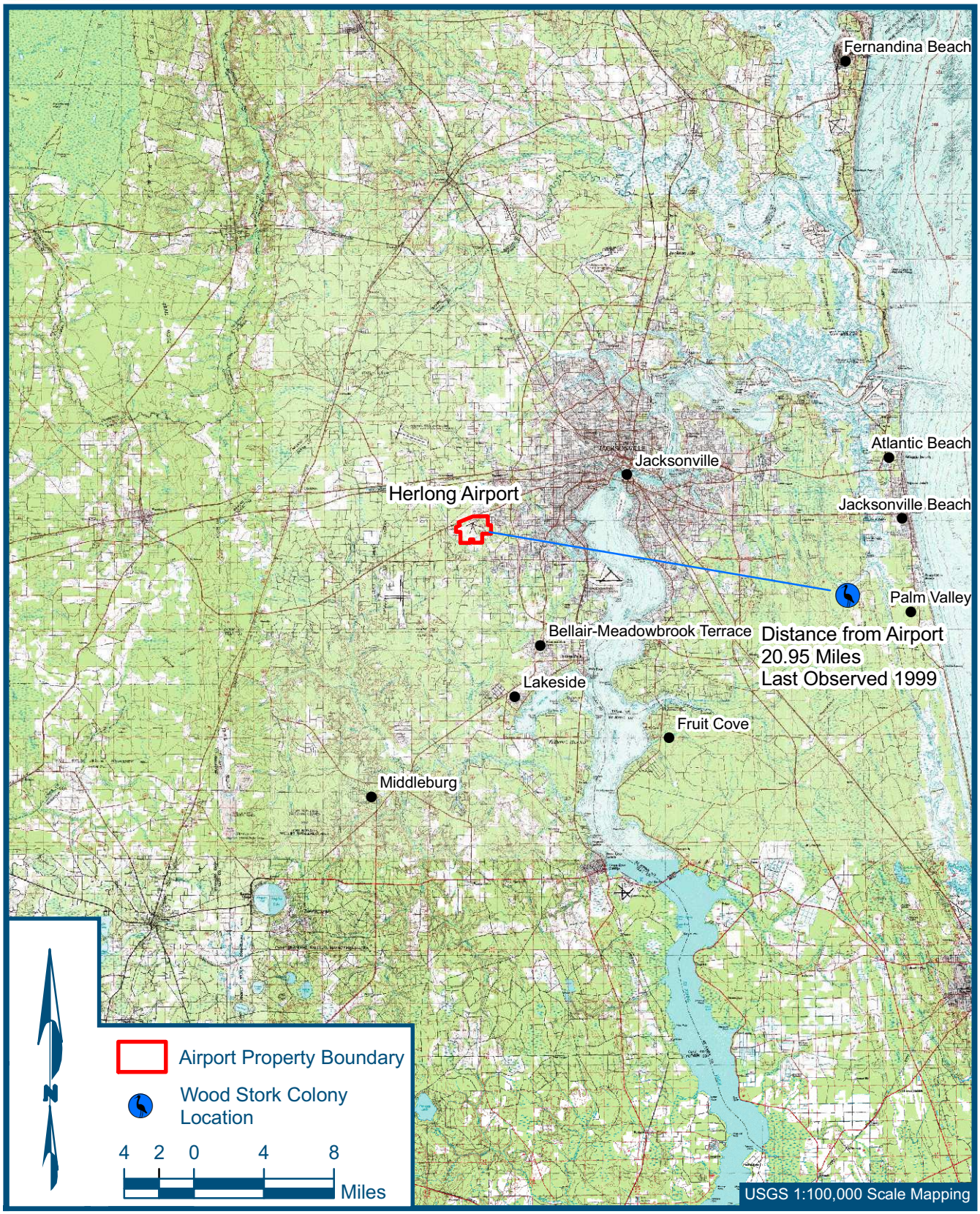

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Figure 2-19

JACKSONVILLE AIRPORT AUTHORITY

FNAI ELEMENT OCCURRENCE MAP

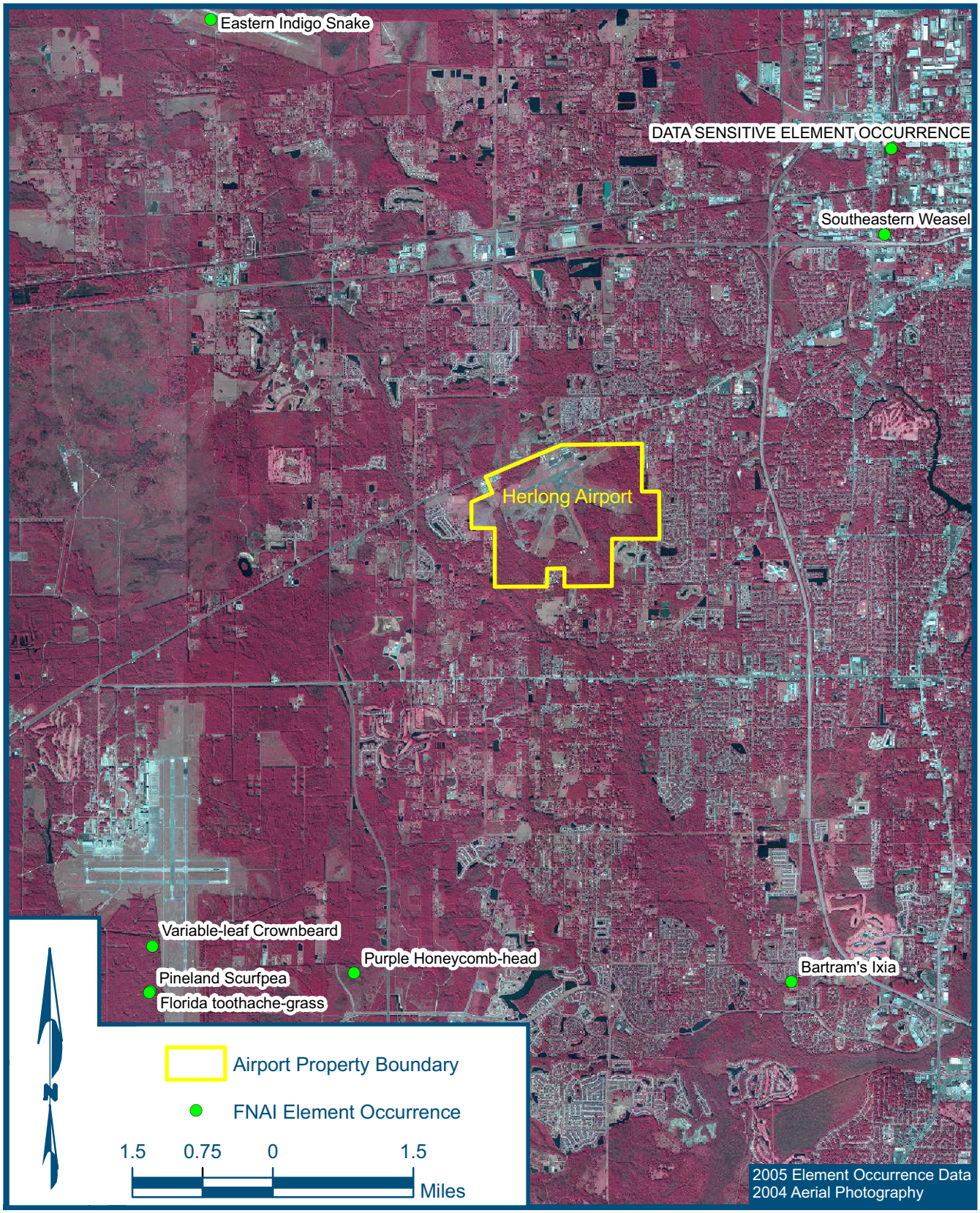

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Figure 2-20

TABLE 2-7
POTENTIALLY OCCURRING LISTED FAUNA
HERLONG AIRPORT

SCIENTIFIC NAME	COMMON NAME	STATUS	
		USFWS	FFWCC
Ambystoma cingulatum	Flatwoods salamander	T	SSC
Rana capito	Gopher Frog	-	SSC
Drymarchon corais couperi	Eastern Indigo Snake	T	T
Gopherus polyphemus	Gopher Tortoise	-	SSC
Pituophis melanoleucus mugitus	Florida Pine Snake	-	SSC
Aramus guarauna	Limpkin	-	SSC
Athene cunicularia floridana	Florida Burrowing Owl	-	SSC
Egretta caerulea	Little Blue Heron	-	SSC
Egretta thula	Snowy Egret	-	SSC
Egretta tricolor	Tricolored Heron	-	SSC
Eudocimus albus	White Ibis	-	SSC
Falco sparverius paulus	Southeastern American Kestrel	-	T
Haliaeetus leucocephalus	Bald Eagle	T	T
Mycteria americana	Wood Stork	E	E
Picoides borealis	Red-Cockaded Woodpecker	E	T
Sciurus niger shermani	Sherman's fox squirrel	-	SSC
Procambarus pictus	Black Creek Crayfish	-	SSC

LEGEND:
USFWS = United States Fish and Wildlife Service
FFWCC = Florida Fish and Wildlife Conservation Commission
E = endangered species
T = threatened species
SSC = species of special concern

Source: Official Lists of Endangered and Potentially Endangered Species in Florida, FFWCC. 2004

TABLE 2-8
POTENTIALLY OCCURRING LISTED FLORA
HERLONG AIRPORT

SCIENTIFIC NAME	COMMON NAME	STATUS	
		USFWS	FFWCC
Balduina atropurpurea	Purple Honeycomb-head	-	E
Calydorea coelestina	Bartram's Ixia	-	E
Cheilanthes microphylla	Southern Lip Fern	-	E
Coelorachis tuberculosa	Piedmont Jointgrass	-	T
Ctenium floridanum	Florida Toothache-grass	-	E
Drosera intermedia	Spoon-Leaved Sundew	-	T
Forestiera godfreyi	Godfrey's Privet	-	E
Lantana depressa var. *floridana*	Atlantic Coast Florida Lantana	-	E
Orbexilum virgatum	Pineland Scurfpea	-	PE
Peperomia humilis	Terrestrial Peperomia	-	E
Pteroglossaspis ecristata	Giant Orchid	-	T
Schoenolirion croceum	Yellow sunnybell	-	PE
Spiranthes polyantha	Green Ladies'-tresses	T	E

LEGEND:
USFWS = United States Fish and Wildlife Service
FFWCC = Florida Fish and Wildlife Conservation Commission
E = endangered species
T = threatened species
SSC = species of special concern

Source: Official Lists of Endangered and Potentially Endangered Species in Florida, FFWCC. 2004

WETLANDS

Available GIS maps and literature were compiled and reviewed to determine the types of wetland systems that may occur within the project study area. Data sources used in this evaluation included:

- USGS Quadrangle Map;
- USFWS NWI maps **(Figure 2-21)**;
- FLUCFCS maps (SJRWMD 2000) (**Figure 2-16**);
- National Resource Conservation Service (NRCS) soil data **(Figure 2-22)**; and,
- Project aerial photography.

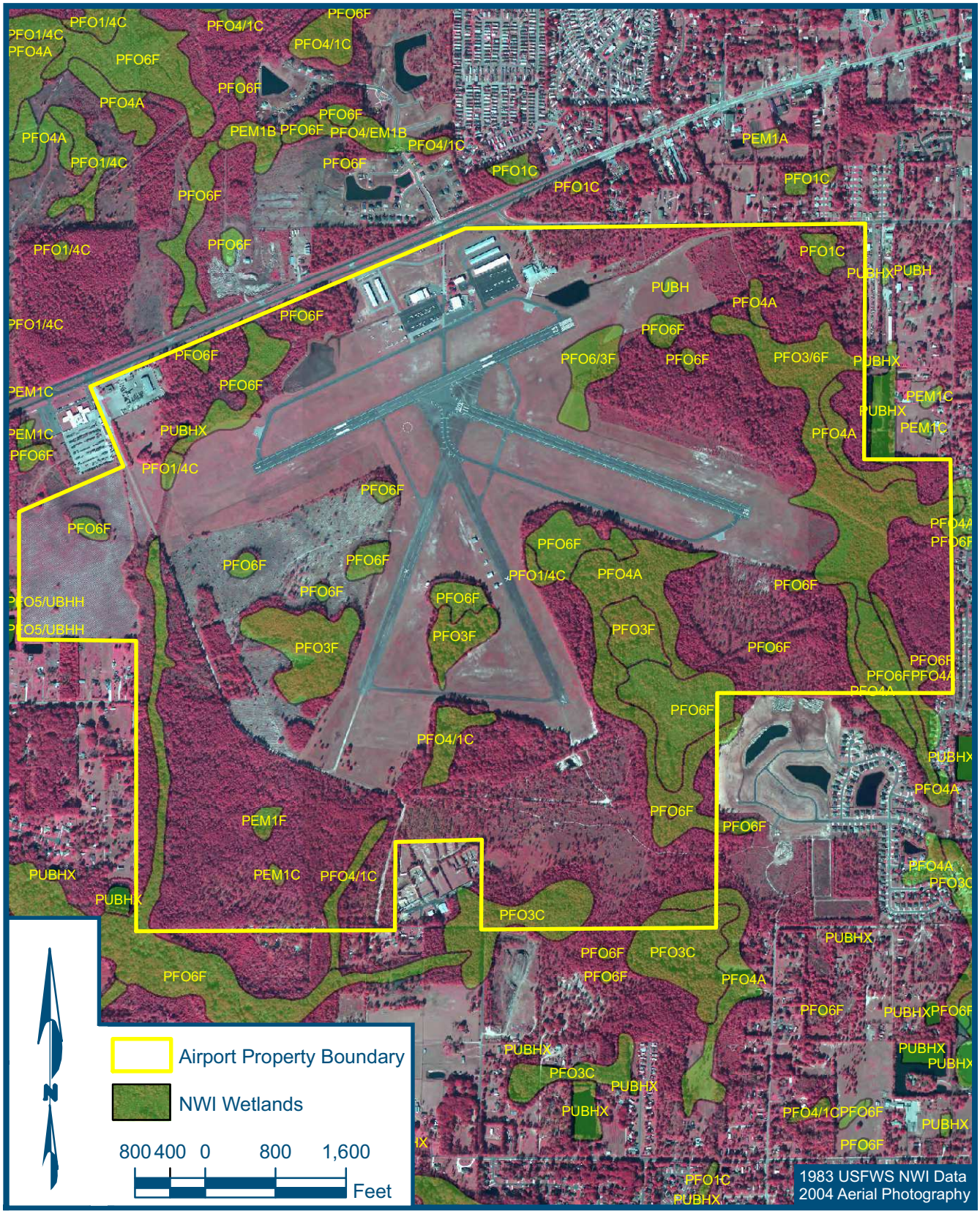
The NWI map data indicates that there are three wetland types within the project area, freshwater emergent wetlands (Cowardin classification codes PEM1C and PEM1F), freshwater forested/shrub wetlands (codes PFO1/4C, PFO1C, PFO3/6F, PFO3C, PFO3F, PFO4/1C, PFO4A, PFO5/UBH, PFO6/3F, and PFO6F), and freshwater ponds (codes PUBH and PUBHX, **Figure 2-21**). Field observations made during the site visit conducted on August 22, 2005 resulted in the preliminary identification and verification of 10 wetland types that fall within the following FLUCFCS categories **(Figure 2-16)**:

- Reservoirs - pits, retention ponds, dams (5300)
- Bay swamp (6110)
- Mixed wetland hardwoods (6170)
- Cypress (6210)
- Hydric pine flatwoods (6250)
- Wetland forested mixed (6300)
- Freshwater marshes (6410)
- Wet prairies (6430)
- Emergent aquatic vegetation (6440)
- Mixed scrub-shrub wetland (6460)

Based upon the NWI and FLUCFCS data, wetlands occur in numerous areas throughout the Airport's property, but are particularly prevalent on the eastern portion of the Airport and in the undeveloped area south of Runway 11/29. Based upon the preliminary field visit, upland areas identified on the NWI and the FLUCFCS maps have the potential to contain wetlands. A formal wetland determination is necessary to determine the location, area, and boundary of wetlands within the Airport before individual project construction can begin.

JACKSONVILLE AVIATION AUTHORITY

USFWS NWI MAP

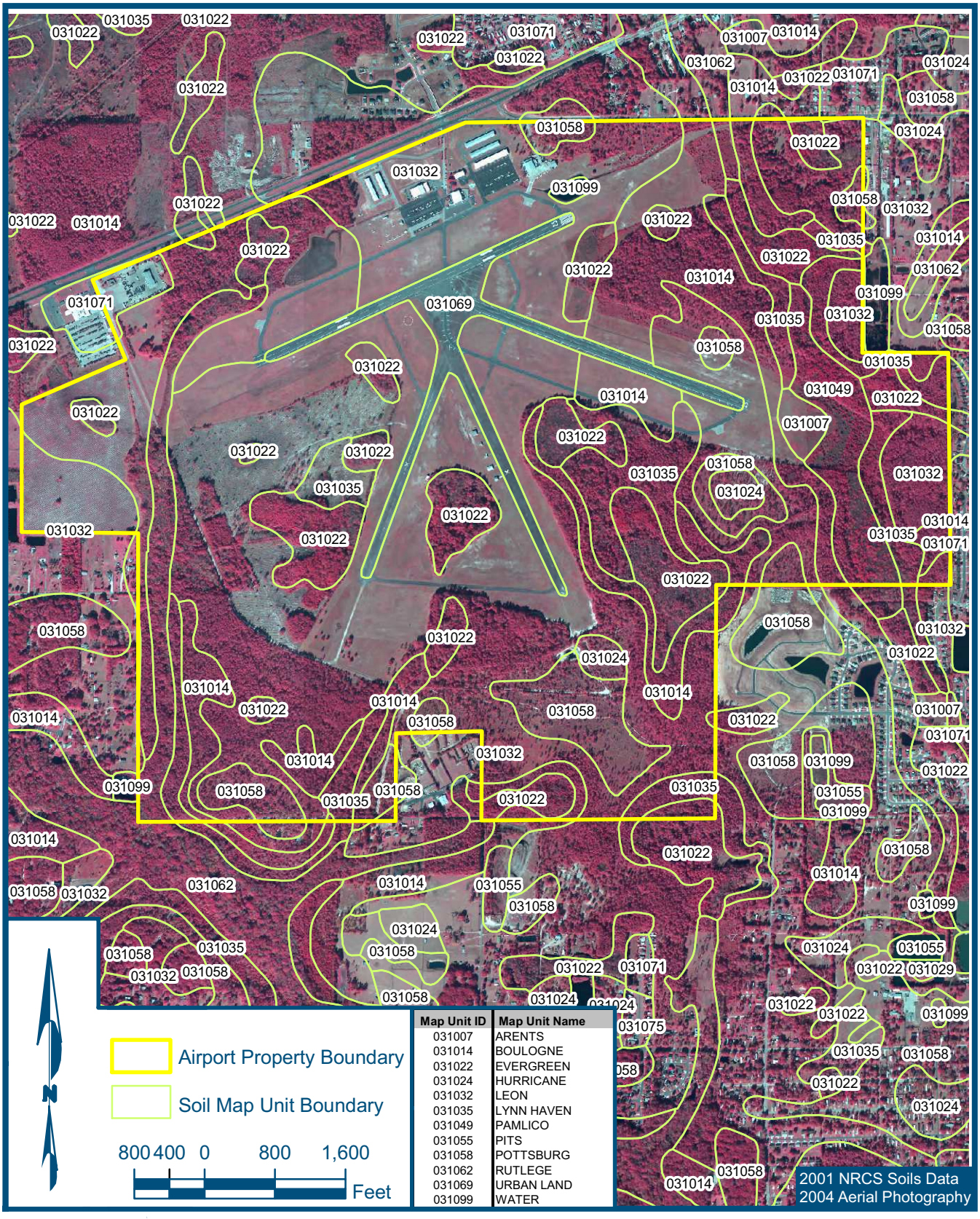


LPA

Figure 2-21

JACKSONVILLE AVIATION AUTHORITY

NRCS SOILS MAP



Map Unit ID	Map Unit Name
031007	ARENTS
031014	BOULOGNE
031022	EVERGREEN
031024	HURRICANE
031032	LEON
031035	LYNN HAVEN
031049	PAMLICO
031055	PITS
031058	POTTSBURG
031062	RUTLEGE
031069	URBAN LAND
031099	WATER

LPA

Figure 2-22

FLOODPLAINS

A review of FIRM mapping indicates that portions of the Herlong Airport property area are within the FEMA designated 100-year floodplain. The eastern side of the Airport property is within designated Zone AO, which is defined as an area of 100-year floodplain that is subject to flood depths of one to three feet, usually due to sheet flow on sloping terrain. An additional area of 100-year floodplain that is designated Zone AE is located in the extreme southwest corner of the Airport property. The Zone AE designation describes an area of 100-year floodplain for which the base flood elevation has been determined. The base flood elevation line of this portion of 100-year floodplain is at approximately 47.5 feet above sea level, referenced to the National Geodetic Vertical Datum of 1929. The remainder of the Airport is not mapped as being within the 100-year floodplain **(Figure 2-23).**

COASTAL ZONE MANAGEMENT PROGRAM

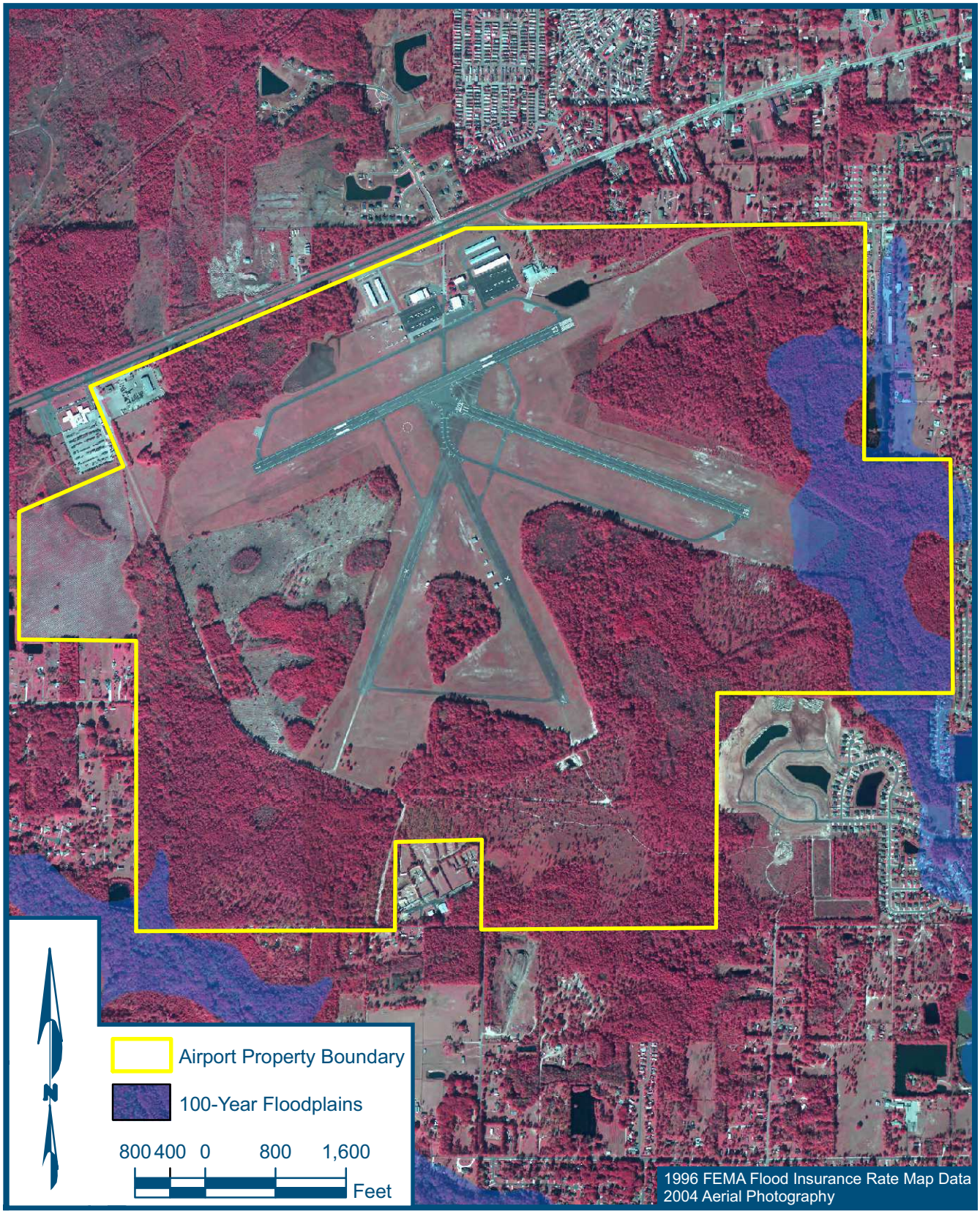
The entire State of Florida is located within a coastal zone due to the distance between the east and west coasts. As a result, all Florida counties have a Coastal Zone Management Program which evaluates and maintains coastal zone consistency. Coastal Zone Consistency means that the project will not have any impact to the Florida shoreline. JAA already complies with the Duval County Coastal Zone Management Program since all airports within the JAA system comply with Federal, State and Local environmental laws and regulations. If and when JAA applies for a permit or performs an environmental assessment associated with specific projects at HEG, both Duval County and U.S. Corps of Engineers will evaluate the project for Coastal Zone Consistency.

FARMLAND

Based on information obtained from the NRCS Field Office Tech Guide for Duval County, there are no prime or unique farmland soils, and therefore no farmlands that would be subject to the conditions of the Farmland Protection Policy Act, on Airport property.

JACKSONVILLE AVIATION AUTHORITY

FEMA FLOODPLAINS MAP



LPA

Figure 2-23

SUMMARY

The information in this section provides the foundation upon which the remaining elements of the Master Plan process will be developed. Information on current infrastructure and operations will serve as a basis for the development of forecasts of aviation activity and facility requirements.

This information will provide guidance to assess potential changes to facilities and/or procedures necessary to meet the goals of the Airport planning process. Analysis of the inventory of Airport facilities determines and prepares for the needs presented by the Airport users in the short-, intermediate, and long-term. The inventory of existing conditions is the first step in the complex process to determine the steps that are needed to meet projected aviation demands in the community. The information collected is based upon year 2005 numbers, which serves as the baseline/foundation for the analysis and forecasting of future airport activity and facilities.

CHAPTER THREE
Aviation Activity Forecasts

INTRODUCTION AND BACKGROUND

This chapter presents projections of aviation activity at Herlong Airport (HEG) that will be used as the basis for facility planning at the Airport over the twenty-year planning period. The objective of the forecasts is to provide airport management with realistic estimates of future aviation activity. From this information, a benchmark of facilities may be obtained and compared to determine the adequacy of existing airport facilities. Projections of aviation demand provide the basis for:

- Determining the Airport's future role regarding the types of aircraft that need to be accommodated as well as the types of future demand.
- Evaluating the capacity of existing Airport facilities to meet projected aviation demand.
- Estimating the type and size of airside and landside facilities required in future years.

In addition, external factors including recent and on-going aviation industry trends and projections will be evaluated as to their impact on HEG. HEG is designated under NPIAS as a general aviation reliever airport. As a general aviation airport, it serves a variety of aviation activities, including personal and recreational flying, corporate flying, glider and ultra light flying, and other similar activities. The Airport currently accommodates flight training activity, and future prospects envision HEG increasing its role as a provider of flight training services. As a result, particular attention was given to such factors as fuel prices, FDOT funding, the national and local economy, airspace restrictions and other security measures instituted after September 11, 2001, as well as such aviation trends as the development of the light sport aircraft and the approval of the Sport Pilot License.

Nationally, the use of general aviation for business travel has increased dramatically due in part to the development of the fractional aircraft ownership industry as well as extensive commercial airport and airline security measures. In addition, corporate aviation activity is expected to increase as a result of economic recovery and development of very light jet aircraft, such as the Eclipse 500 and Cessna Mustang, which sell for less than $2.5 million. Interest in this type of aircraft has grown significantly and is expected to continue in the future. Furthermore, learn-to-fly programs, approval of the Sport Aircraft license, aircraft safety improvements, as well as the development of smaller, quieter and more cost effective aircraft models is anticipated to further drive recreational general aviation activity at HEG.

The standard planning period for an airport master plan is twenty years. Forecasts for HEG are presented in 5, 10, 15 and 20-year key increments, where 2010, 2015, 2020 and 2025 were designated as the key planning years. The base year for this analysis is 2005. Forecast development and historic operations collected from Airport Management were verified from a number of sources including based aircraft operations, fuel sales as well as a survey of airport operations performed over a two-week period. The development of forecasts also includes analyses of historical data as provided by the Federal Aviation Administration (FAA), the Florida Department of Transportation (FDOT) and socioeconomic data from the region and the state of Florida. This data was supplemented with information obtained from Airport Management and FAA Airport Master Record (5010) forms to obtain a complete picture of operational activities, emerging trends, and the community's overall vision for the Airport.

HISTORICAL SOURCES

It is important that the historical data gathered and presented in this chapter is as accurate as possible, as successful aviation forecasting is dependent on such data. However, airports without air traffic control towers (ATCT) do not typically record historic information on a regular basis. Therefore, several sources were consulted to obtain historic data. These sources include: the Federal Aviation Administration (FAA), Terminal Area Forecast (TAF) and 5010 Airport Master Records, Florida Department of Transportation (FDOT), Florida Aviation System Plan (FASP), and the 2000 HEG Airport Master Plan Update. In addition, information from HEG Airport Manager and staff, and tenant interviews were also used and incorporated in this section. Finally, the consultant utilized the formulas and recommendations outlined in the report, "*Model for Estimating General Aviation Operations at Non-Towered Airports using Towered and Non-Towered Airport Data*," June 2001 by GRA Inc. as recommended by FAA Headquarters to develop an effective baseline for determining future operations.

METHODOLOGY

Various methods of forecasting aviation demand exist and are widely used throughout the industry. In order to adequately identify the future needs of the airport, a number of projections were developed. In this chapter, the following elements were analyzed and subsequent projections prepared.

- **Based Aircraft**
  - Single-Engine
  - Multi-Engine (piston and turboprop)
  - Jet
  - Rotor

- **Aircraft Operations**
  - General Aviation
  - Local/Itinerant
  - Instrument

- **Peak Activity**
  - Peak Month
  - Average Day Peak Month
  - Peak Hour

Previous forecasts and their accuracy over time were also considered to identify historical trends and their relationship to national, state and local socioeconomic and aviation activities. These methods were applied to develop the most accurate forecasts possible at HEG, and will be discussed in greater detail throughout this chapter.

Additionally, the activity forecasts in this section were developed in accordance with the standards and guidelines set forth in Federal Aviation Administration (FAA) Advisory Circulars (AC) 150/5070-6B, 150/5300-13, and other applicable federal and state publications.

Although these forecasts cover an extended timeframe, aviation, social and economic trends can only be reasonably projected for the first five years. Unexpected events in any of the above trends, which cannot be factored into the assumptions of the forecast, can cause dramatic changes within the 20-year planning period. Therefore, aviation activity forecasts and master plans themselves must continually be evaluated and updated on a regular basis, approximately every five years.

HISTORIC DATA

Traditionally, HEG has served as a general aviation reliever airport to the commercial passenger service airports in the region, primarily to Jacksonville International Airport (JAX). As such, HEG is one of three highly active general aviation airports in the Jacksonville Metropolitan Statistical Area (MSA), which also includes Craig Airport and Cecil Field.

Based upon historical data and discussions with Airport management, the Airport primarily serves single-engine, multi-engine, rotorcraft, as well as a significant number of glider and ultra light aircraft. Based upon data obtained from the FBO, HEG accommodates 170 based aircraft, the majority of which are single-engine piston. Although historically based turbojet aircraft have remained stagnant from 2003 through 2005, it is anticipated, based upon new technology and the anticipated increase in turbine aircraft worldwide that based turbojet aircraft at HEG will likely increase. However, while the potential exists for jet aircraft to be based at HEG, historical data shows that the Airport primarily supports smaller general aviation aircraft. This is primarily due in part to limited runway length rather than the functional role the Airport can support.

Reviewing activity at the Airport, operations at HEG are dominated by general aviation and sport aircraft activity. However, approximately 2,240 itinerant military operations occurred in 2005 as a result of helicopter training primarily in the form of "Touch and Go" operations.

Aircraft operations forecasts provided in the 2000 Master Plan Update, 2006 FAA Terminal Area Forecasts (TAF) and 2004 Florida Aviation System Plan (FASP) which were available at the time of this writing, incorrectly identified corporate general operations as air taxi operations. JAA has corrected this error by adding the air taxi operations to the transient general aviation operations in recapping each of these past forecasts.

Historic Based Aircraft

In order to realistically forecast based aircraft, a reliable source or combination of sources must be obtained. **Table 3-1** compares historic based aircraft data obtained from the 2006 FAA TAF, 2004 FASP, 2000 Master Plan Update with information obtained from airport management.

TABLE 3-1
HISTORIC BASED AIRCRAFT

Year	Airport Records*	2006 FAA TAF	2004 FASP	2000 MPU
1995	101	NA	NA	101
1996	101	NA	NA	101
1997	129	NA	NA	129
1998	118	NA	131	118
1999	126	NA	130	126
2000	142	NA	130	130
2001	143	143	130	133
2002	162	162	163	137
2003	162	162	162	141
2004	162	162	167	144
2005	**170**	163	170	148
AAGR % 2001-2005	**4.42%**	**3.33%**	**6.94%**	**2.71%**

**Source: Herlong Airport Management Records and The LPA Group Incorporated, 2006*

Historic based aircraft fleet mix data was obtained from Airport Management records as well as site visits. This data is provided in **Table 3-2**.

TABLE 3-2
HISTORIC BASED AIRCRAFT FLEET MIX

Year	Single-Engine	Multi-Engine	Jet*	Rotorcraft	Experimental/ Gliders/Other	Total
1995	75	13	0	1	12	**101**
1996	75	13	0	1	12	**101**
1997	95	15	0	2	17	**129**
1998	90	10	0	2	16	**118**
1999	97	10	0	2	17	**126**
2000	103	13	0	1	25	**142**
2001	103	14	0	1	25	**143**
2002	114	15	0	3	30	**162**
2003	120	15	5	3	19	**162**
2004	120	15	5	4	18	**162**
2005	128	15	5	4	18	**170**

*Note: *Jet refers to both turboprop and turbojet aircraft based upon FAA standard naming criteria.*
Source: Herlong Airport Management Records and The LPA Group Incorporated, 2006

The number of historic based aircraft numbers varied noticeably amongst the sources noted above. However most followed similar patterns of fluctuation, especially in 2001, during which the negative offset of the September 11 terrorist attacks contributed to a decline in aviation activity as a whole, for both general aviation and non-general aviation alike. Subsequent years following 2001 saw dramatic increases in both the number of based aircraft and annual operations occurring at HEG. Since HEG does not have an Air Traffic Control Tower (ATCT), a precise, thorough log of aircraft activity could not be consulted; therefore, it is generally assumed that information provided by Airport management and obtained from the 2004 Florida Aviation System Plan (FASP) (published January 10, 2005) fairly represent the historical numbers depicted in the previous table.

Historic Annual Aircraft Operations

The FAA defines an operation as either a single aircraft landing or takeoff. Under this definition, an aircraft "touch and go" is considered two operations, since the aircraft conducts a landing and a takeoff. Past aircraft operations at HEG are recorded in the 2006 FAA TAF, 2005 FAA 5010 Form, 2004 Florida Aviation System Plan (FASP), 2000 Master Plan Update, and by Airport Management. These data sources are compared in **Table 3-3**. The historical operations provided by JAA management were considered the most accurate and were, therefore, used to determine based aircraft and annual operations forecasts.

TABLE 3-3
HISTORIC ANNUAL OPERATIONS

Year	Airport Records*	FAA TAF	FASP	2000 MPU
1995	67,000	NA	NA	65,100
1996	80,100	NA	NA	65,100
1997	82,839	NA	NA	80,100
1998	66,726	NA	66,726	70,000
1999	65,000	NA	65,000	70,000
2000	72,200	NA	72,200	72,200
2001	65,000	65,300	65,000	74,063
2002	80,700	65,300	80,700	75,976
2003	87,700	65,300	87,000	77,940
2004	87,870	65,300	87,892	79,957
2005*	**65,341**	65,300	88,784	82,200
AAGR % 2001-2005	**0.12%**	**0.00%**	**8.11%**	**2.64%**

**Note: Includes approximately 2,000 operations attributed to Military Operations*
Source: Herlong Airport Management Records and The LPA Group Incorporated, 2006

Since HEG does not have an air traffic control tower on site, the consultant used fuel flowage information, aircraft operation counts obtained from the FBO staff, Jacksonville ARTCC data as well as a sample week of operations during the historic peak month, to obtain the historic annual operations for 2005. This discrepancy between the base year 2005 annual operations and previous years may be attributable to the cost of operating an aircraft, i.e. maintenance, fuel, storage, etc. as well as the long-term impacts of new security procedures as a result of September 11.

PREVIOUS AVIATION ACTIVITY FORECASTS

Since the 2000 Master Plan Update, there have been no significant forecasting efforts at HEG. Although new forecasts were created for this Master Plan Update (MPU), data contained in the previous plan (2000 MPU) prove invaluable for comparison purposes and are used to supplement the analyses conducted during this study.

2000 Master Plan Update

For the purposes of this study, the 2000 Master Plan forecast was reviewed in order to obtain a historical trend of both based aircraft and aircraft operations. The 2000 Master Plan Update based aircraft forecast is shown in **Table 3-4**. For comparison purposes, forecast data was extrapolated to the year 2025.

TABLE 3-4
2000 MASTER PLAN UPDATE – FORECAST OF BASED AIRCRAFT

Base Year	Single-Engine	Multi-Engine	Jet	Rotor	Glider/Other	Total
1999	94	14	-	2	16	126
Forecast						
2005	108	16	-	3	21	148
2010	123	17	-	3	25	168
2020	158	21	-	4	30	213
Extrapolated by LPA						
2025	176	24	0	5	33	238

Source: 2000 Master Plan Update, AVCON

According to the 2000 forecast, based aircraft were estimated to grow at an average yearly rate of 2.63%.

Table 3-5 depicts the 2000 Master Plan Update forecast of operations for the planning period. Local operations forecast in the previous master plan and extrapolated through 2025 by The LPA Group Incorporated reveal an average annual growth rate of 2.88 percent. Itinerant operations reveal an average annual growth rate of 3.59 percent. Whereas itinerant operations as a percentage of total operations are projected to steadily increase, local operations as a percentage of total operations are projected to decline over the forecast period. It should be noted that the 2000 Master Plan forecast indicates local operations are projected to grow from 48,600 in 2005 to over 84,000 in 2025. However, itinerant operations are forecast to grow at a faster rate resulting in declining percentage of local operations.

TABLE 3-5
2000 MASTER PLAN UPDATE – LOCAL/ITINERANT SPLIT OF PROJECTED AIRCRAFT OPERATIONS

Year	Local Operations	Itinerant Operations	Total Operations
Base Year			
1999	40,500	29,140	69,640
Forecast			
2005	48,682	37,322	86,004
2010	56,346	44,986	101,332
2020	74,977	63,617	138,594
Extrapolated by LPA			
2025	84,293	72,933	157,226

Source: The LPA Group Incorporated, 2006

FAA Terminal Area Forecast

Terminal Area Forecasts (TAF) are prepared by the FAA to meet the planning needs of their offices concerned with future traffic levels at the nation's airport facilities. Except for specific regional or state requests, the airports included in the FAA's TAF report must meet at least one of the following criteria:

- Have an existing FAA tower.
- Have an existing FAA Contact tower.
- Candidate for a FAA tower.
- Currently receiving or expected to receive scheduled air carrier or regional/commuter service.
- Currently exceed 60,000 itinerant or 100,000 total aircraft operations.
- Reported 10 or more based aircraft on the latest available Airport Master Record (FAA 5010 Form).

HEG is included within the FAA TAF since it has consistently reported ten or more based aircraft.

Forecasts in the FAA TAF are calculated using a number of methods. Typically, projections are calculated using regression analysis with various national economic indicators as the independent variables. **Table 3-6** depicts the figure contained in the 2006 TAF for HEG.

TABLE 3-6
2006 FAA TERMINAL AREA FORECAST

Year	Based Aircraft	Annual Operations
Base Year		
2005	163	65,300
Forecast		
2010	170	65,300
2015	178	65,300
2020	185	65,300
2025	193	65,300

Source: FAA Terminal Area Forecast, 2006

As reflected in the 2006 TAF, the FAA has forecast a straight-line projection of activity over a 20-year period for aircraft operations. This forecast indicated that there is a 0.85 percent annual average growth rate for based aircraft and a 0 percent annual average growth rate for annual operations throughout the 20-year planning period. While the 2006 FAA TAF Forecast for based aircraft appears to have some validity, the flat operations forecasts appears to be in error. Therefore other forecasts will be analyzed.

2004 Florida Aviation System Plan

2004 Florida Aviation System Plan (FASP) is a broad blueprint that guides the development of Florida's 131 public airports. This plan is necessary to ensure that airports work together effectively as a statewide transportation system, provide a link to a global air transport network, and effectively interface with regional surface transportation.

The latest edition of the FASP (2004) was based on data collected up to and including 2003. The FASP incorporates traditional aviation planning techniques to identify future air traffic demands. In addition, the FASP includes a strategic planning element to allow FDOT to respond to aviation and economic trends, including emerging technologies, projected funding shortfalls and shifting priorities. **Table 3-7** depicts the 2004 FASP forecast for HEG during the 2003-2024 period. Data shown for the year 2024 was determined by using growth rates derived from the FASP forecast.

TABLE 3-7
2004 FLORIDA AVIATION SYSTEM PLAN

Year	Based Aircraft	Annual Operations
Base Year		
2003	162	87,000
Forecast		
2010	188	93,276
2015	207	98,034
2020	228	103,034
Extrapolated by LPA		
2025	249	107,955

Source: 2005 Florida Aviation System Plan (FASP)

The average annual growth rate associated with the FASP general aviation based aircraft forecast is 1.95 percent over the 2003-2025 period. During the same period, the FASP projects general aviation operations to increase at a rate of 0.99 percent annually.

The National Forecast

The national forecast is a forecast created by the FAA to project aviation growth for the U.S. The FAA Aerospace Forecasts, Fiscal Years 2006-2017, was used to express national trends in the general aviation industry in order to determine the correlation between national trends and activity at HEG. Using a market share analysis of historic airport activity to the national activity as presented in the FAA Aerospace Forecast, resulted in a 1.11 percent average annual growth rate (AAGR) for based aircraft and 1.14 percent AAGR for aircraft operations through the twenty-year planning period. The results of these calculations are shown in **Table 3-8**.

TABLE 3-8
MARKET SHARE OF U.S. GENERAL AVIATION ACTIVITY
(FAA AEROSPACE FORECASTS - 2006 THROUGH 2017)

Year	Based Aircraft	Total Annual Operations
Base Year		
2005[1]	170	65,341
Forecast*		
2010	180	70,049
2015	190	72,996
Extrapolated by LPA		
2020	200	77,329
2025	212	81,919
AAGR 2005-2025	1.11%	1.14%

Notes: [1]Source is Herlong Airport Actual Operations and Based Aircraft 2005, Airport Management and Fuel Sales
** Forecasts were based upon historic percentage (2005) of HEG based aircraft and operations compared to National Forecast provided in FAA Aerospace Forecasts, 2005-2016*
Source: FAA Aerospace Forecasts, 2006-2017

Forecasting Approach

Historic trends are one of the primary considerations that can influence activity forecasts at an airport. By tracing these trends, it is possible to determine the impact that economic fluctuations, as well as changes in the industry have had on activity at the airport. The study of historical trends is particularly valuable at those airports having an air traffic control tower (ATCT) recording takeoff and landing operations for several years.

Historic data for HEG from sources such as the FAA TAF, FAA Form 5010, or FASP seem to be inconsistent. Thus, 2005 historic data obtained from HEG staff, JAX ARTCC and fuel flowage data was used as the base year for the operations and based aircraft forecasts. Since 5-plus years of historic data was available for most items, airport activity could be compared to various local economic indices including population, employment and per capita income. A linear forecast based upon the average annual growth rate for the period 1997-2005 was applied to the base year annual operations. However, this forecast methodology was discounted since fluctuations in historical data are attributed to some extent by outside events which may or may not occur in the future.

The multiple regression methodology using population, employment and per capita income was also developed to project future aviation activity at HEG. However, no correlation was found between the socio-economic indices and aircraft operations and based aircraft and was, therefore, ultimately discounted. Finally updates to the National Forecast (FAA Aerospace Forecast), Florida Aviation System Plan, and Terminal Area Forecasts, as well as projections of general aviation activity based

upon market share analysis were considered feasible methods of forecasting aircraft operations and based aircraft at HEG.

Industry trends, as well as national and local economy reviews, were also used to project aircraft activity at the Airport. The best source of information on the nation's general aviation activity is contained in the 2005 FAA Aerospace Forecasts. Given the nature of the airport operations, primarily General Aviation (GA), projections of future activity based upon these forecasts, adjusting for local trends, was considered a reasonable forecasting approach. Several factors were considered which might influence the course in which activity at the airport develops. These included evaluating anticipated general aviation development, airport geographical constraints, and industrial/business development on and surrounding HEG. The primary goal of the analysis was to develop an approach that gives reasonable attention to these factors while at the same time providing a rational basis upon which to support the forecast selection.

It is also noteworthy that substantial demographic and economic growth in an area rarely triggers an equal general aviation activity expansion. Nowadays, general aviation growth at an airport usually falls within a narrow range, at a rate usually somewhat lower than the socioeconomic data alone would suggest. Unless an airport has readily developable land and funds, as well as excessive general aviation demand, annual average growth rates over a 20-year planning period usually fall under five percent. Therefore, a projection of aircraft activity assuming national growth and customized for local conditions can be just as useful. Additionally, GA growth relies on many other factors, which include: level of services offered, competitive pricing, space availability, airfield characteristics, local area attractiveness, and pilot perception of services. While these factors cannot be tailored into the equation leading to the airport activity forecast, these do contribute directly to the level of operations at HEG. As a result, these forecasts assume that Airport Management, Fixed Based Operator (FBO), and other tenants will actively support GA activity and initiate the appropriate measures to either maintain or extend air traffic at the airport.

INDUSTRY TRENDS AND IMPACTS OF SEPTEMBER 11, 2001

Decreases in general aviation activity were experienced across the nation in the late 1980's and early 1990's due to significant increases in the cost of owning a general aviation aircraft. A large part of this cost was directly attributable to increasing product liability costs, as well as increasing operating costs. Unfortunately, this period, which was also affected by a national recession, ultimately forced the closure of nearly every manufacturer of general aviation piston aircraft. Legislators responded to the severe downturn with the passage of the General Aviation Revitalization Act of 1994. The signing of this act provided a renewed era of growth for the general aviation market, which has led to recovery in the industry up through the end of 2001.

After passage of the General Aviation Revitalization Act, two of the largest manufacturers of small aircraft resumed production in the general aviation market. The Cessna Aircraft Corporation re-

entered the single-engine piston aircraft market for the first time since 1986. In addition, the New Piper Aircraft Corporation emerged from Chapter 11 bankruptcy protection to restart and increase its previous production schedule. Other aircraft manufacturers and aviation suppliers also began hiring and expanding their production. Overall, revitalization of the industry has had a positive effect on the number of active general aviation aircraft, and therefore on the number of operations these aircraft conduct in the U.S. According to the 2005 FAA Aerospace Forecasts, annual shipment of U.S. manufactured general aviation aircraft has constantly increased from 1994 to 2000. This was significantly facilitated by the strong economic cycle of the mid to late 1990s.

Indeed, the unfortunate events of September 11, 2001 exacerbated a decline already evident within the general aviation industry and the economy as a whole. Whereas the commercial aspect of aviation has received the immensity of Federal assistance and attention, the widespread decline of aviation activity spread throughout the industry. Between 2001 and 2003, rising fuel costs sharply impacted the delivery of new aircraft, especially jet aircraft, and were further hampered by the generally weak-to-recover economy. Nonetheless, the general aviation industry staged a rather significant return to growth in 2004, spurred primarily by the increase in dollars spent on advancing avionics research as well as other aircraft technologies. Impelled by the need to stimulate growth in the pilot population, "learn to fly" programs have been heavily promoted by the industry.

General aviation has seen fluctuating changes among the several segments within the industry, particularly between business/jet aircraft and the smaller, but growing sport aircraft market. But despite a slowdown in the demand for business jets over the past several years, the 2005 FAA Aerospace Forecast assumes that business use of general aviation aircraft will expand at a more rapid pace than that for personal/sport use. The business/corporate side of general aviation should continue to benefit from a growing market for new micro jets. In addition, corporate safety/security concerns for its corporate staff, combined with increased processing times at some U.S. airports have made fractional, corporate, and on-demand charter flights viable alternatives to travel on commercial flights.

According to the 2005 FAA Aerospace Forecasts, GA aircraft shipments reversed a 3-year decline in 2004, whereby U.S. manufacturers of aircraft shipped 1,758 units to various customers, an increase of 10.2 percent over the same period in 2003. Shipments increased for each of the three aircraft categories: turboprops, from 163 to 194 (up 19.0 percent); business jets, from 384 to 403 (up 4.9 percent); and pistons, from 1,590 to 1,758 (up 10.6 percent). The resilience of the piston aircraft market indicates that there is growing interest in the low-end market for general aviation aircraft. Likewise, the stimulation of interest in the new light sport aircraft market could further propel growth among the general aviation aircraft market in the future. New aircraft models are also stimulating interest in the high-end market for general aviation aircraft, particularly the market for new business jet aircraft. The upward trend for new aircraft deliveries is a positive sign to the lulls experienced within the general aviation market during the last few years and signifies a recovery in the economy as a whole.

The number of general aviation pilots is projected to total 575,790 in 2016, an increase of almost 1.6 percent annually over the FAA's forecast period. A significant reason for such growth is due to the certification of nearly 12,000 new sport aircraft pilots spurred by the new sport pilot license. As well, according to the 2005 FAA Aerospace Forecast, the number of private pilots is projected to total 273,600 by 2016, representing an approximate annual increase of 1.2 percent. However, according to the FAA, some student pilots, particularly foreign nationals, who represent nearly 20 percent of the student pilots in the US, are continuing to experience increased scrutiny and lengthy background checks as a result of new security legislation imposed by the Federal Government.

While the general aviation industry will be facing challenges in the years ahead, recent signs of recovery are an important indication of future trends. The most important driving force of this recovery will be the U.S. economy. According to the 2005 FAA Aerospace Forecasts, the active general aviation aircraft fleet is forecast to increase at an average annual growth rate of 1.10 percent and general aviation hours flown are forecast to increase by 1.60 percent annually from 2004 to 2016.

Signs of macroeconomic recovery are evident in the recent growth indication of the general aviation industry. The Bureau of Economic Analysis (BEA) indicated that real GDP in the second quarter of 2005 grew at an annual rate of 3.3 percent, whereas in the first quarter the economy grew at an annualized rate of 3.8 percent. Of interest to business/jet aircraft market is the significant growth in corporate profits, which increased 17.7 percent between the second quarter of 2004 and the same period during 2005. However, longer-term prospects of growth are still uncertain, especially as the outcomes of the war in Iraq remain grim and the potential for future terrorist strikes on the U.S. are still perceived as likely. Therefore, as indicated in the FAA forecast, the general aviation industry will likely remain under the influence of larger economic and political effects, both from within the U.S. and abroad.

Forecast of Based Aircraft

The development of future facilities such as hangars, aprons and tie-downs is heavily driven by the forecasted number of based aircraft expected at HEG during the planning period. Projections for the anticipated number of based aircraft were generated using the following methods.

AIRCRAFT USING FAA TAF GROWTH RATE

The TAF forecast of based aircraft at HEG assumes an annual average growth rate of 0.88 percent from 2005 through 2015. Using this annual growth rate, anticipated based aircraft using the TAF methodology was extrapolated through 2025 resulting in 193 based aircraft by the year 2025. **Table 3-9** outlines the TAF methodology.

PROJECTION OF BASED AIRCRAFT USING FASP

The next forecast method is based upon the Florida Aviation System Plan (FASP). The FASP indicates that the number of based aircraft at HEG is expected to grow at an average annual rate of 1.93 percent. As shown in **Table 3-9**, the FASP forecasts relatively higher based aircraft growth at HEG over the planning period.

PROJECTION OF BASED AIRCRAFT USING HISTORICAL GROWTH

Another method of deriving the based aircraft projection is by using the historical growth rate. The historical data gives a relatively inaccurate picture of an extended growth rate due to significant increases in based aircraft activity between 1998 and 2005. Using historical based aircraft data from the years 1998 through 2005 resulted in an average annual growth rate of 5.35 percent. **Table 3-9** depicts the results of that calculation.

PROJECTION OF BASED AIRCRAFT USING NATIONAL FORECAST PROJECTIONS

An additional viable method of forecasting based aircraft is to use market share analysis. This data is used to derive projections of based aircraft through the application of national trends in the aviation industry. The national forecast was obtained from 2005 FAA Aerospace Forecasts, which forecasts the number of active aircraft in the nation. The Aerospace forecast defines an active aircraft as any aircraft flying at least one hour during the year. According to the 2005 FAA Aerospace forecast, the number of active general aviation aircraft at HEG is expected to increase at an average annual growth of 1.10 percent over the next twelve years. This growth rate was applied to the base year to extrapolate the forecast national growth for the remainder of the planning period, as indicated in **Table 3-9**.

SELECTED BASED AIRCRAFT FORECAST

When selecting the forecast of based aircraft, all the previously mentioned forecasting methods were taken into account. Forecasts were analyzed, reviewed and compared to determine how they compare to the expected growth at the airport. The selected based aircraft forecast should be the best representation of what is expected to occur at HEG. The selected forecast can be one of the previously mentioned methods or a combination of them.

Previous forecast projections with the exception of the historic (linear) forecast appear valid, and, therefore, were used to develop the preferred based aircraft forecast. Although HEG has seen an increase in based aircraft since 1998 due primarily to the construction of several hangar facilities, it is unlikely that such liberal growth can be sustained for an extended period of time. Therefore,

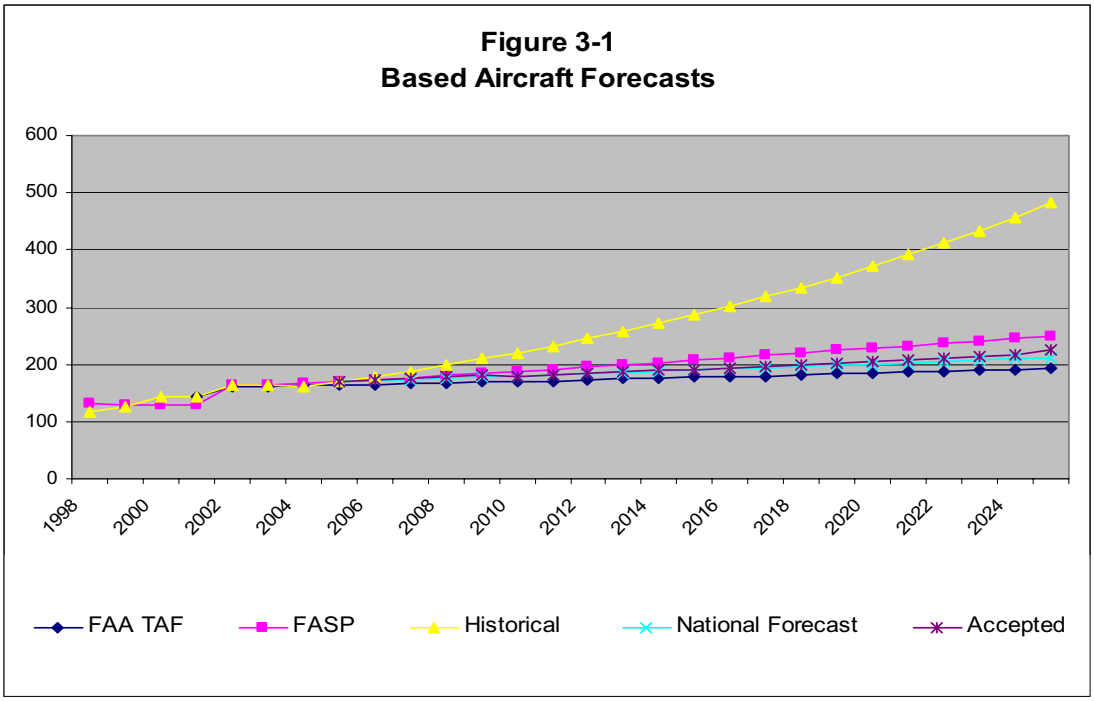
applying the 2006 FAA TAF, 2004 FASP and 2005 FAA Aerospace, 224 based aircraft were projected for the year 2025. This represents an average annual growth rate of 1.39 percent over the twenty-year planning period. **Figure 3-1** is a graphical representation of the selected forecast. **Table 3-9** depicts the selected forecast data.

TABLE 3-9
PROJECTIONS OF BASED AIRCRAFT

Year	2000 Master Plan Update*	2006 FAA TAF Forecast	2004 FASP Forecast	Historical Trend (Linear Projection)	Market Share of US GA Based Aircraft (FAA Aerospace Forecasts)	Preferred Forecast
Base Year						
2005	148	163	170	170	170	170
Projected						
2010	168	170	188	*221*	180	179
2015*	191	178	207	*286*	190	190
2020	213	185	228	*372*	200	205
2025*	236	193	249	*482*	212	224
AAGR (%) 2005-2025	2.36%	0.85%	1.93%	5.35%	1.11%	1.39%

** Extrapolated by The LPA Group Incorporated, 2006*
Source: 2006 FAA TAF, 2004 FASP, FAA Aerospace Forecasts (2005-2016), Airport Management & The LPA Group Incorporated.

Figure 3-1
Based Aircraft Forecasts



Source: The LPA Group, 2006

PROJECTED BASED AIRCRAFT FLEET MIX

Aside from determining the number of based aircraft, it is also vital to determine the aircraft fleet mix in order to develop the appropriate sized facilities. Understanding the future fleet mix would allow the airport to develop the facilities to accommodate various types of aircraft that are forecasted to operate at the airport. The future fleet mix was determined by studying the national fleet mix forecast and comparing it with the fleet mix based at HEG.

National Projection of Active General Aviation Fleet

Every year the FAA generates the active general aviation forecast as part of the FAA Aerospace Forecast. This forecast breaks the general aviation aircraft into distinctive categories. A breakdown of the national activity fleet in 2003 included: 68.15 percent single-engine aircraft, 8.38 percent multi-engine piston, 3.45 percent turboprop, 3.99 percent turbojet, 3.26 percent rotorcraft and 12.77 percent other aircraft (i.e. experimental, sport, and other). The 2003 Active General Aviation Fleet Table was the most recent data available at time of this writing.

An analysis of the active general aviation fleet data reveals certain trends. Single-engine piston aircraft and rotorcraft have experienced a decline in recent years, but the forecast shows that that segment has stabilized and will grow in the future. Turboprops and turbojet aircraft continue to

grow, and significant growth is expected to occur within the very light jet aircraft market and other aircraft associated with the newly developed Small Aircraft Transportation System (SATS).

Several reasons exist to support this anticipated growth. The use of business aircraft by smaller companies has escalated as various chartering, leasing, time-share, partnerships, and fractional ownership agreements have emerged. Businesses increasingly are choosing to use general aviation transport because it provides safe, efficient, flexible, and reliable transportation. Fractional ownership offers consumers a more efficient use of time by providing faster point-to-point travel times, the ability to conduct business while flying, as well as minimum enplaning and deplaning hassles. The continuing popularity of travel by general aviation aircraft is also due to the ability to use smaller, less-congested airports located closer to one's final destination. According to the National Business Aviation Association (NBAA), the number of individuals and companies in the U.S. that own a fractional share of an airplane increased by 52 percent from 2000 to 2002, from 3,834 to 5,827. In addition, new product offerings, such as the Eclipse 500 and the Cessna Mustang, lightweight jets featuring relatively low fuel consumption and having relatively low acquisition costs, will help to stimulate the markets in future years.

Finally, the introduction of light sport aircraft into the active fleet will have a profound effect on the development of this sector of aviation, especially at HEG. Light-sport aircraft are defined as simple, low-performance aircraft that are limited to 1,232 pounds maximum weight, two occupants, a single non-turbine powered engine, stall speed of 39 knots, maximum airspeed of 115 knots, and fixed landing gear. This category includes most existing ultra light aircraft, which the FAA has not registered in the past. To simulate general aviation activity, the FAA recently approved new certification requirements for light-sport aircraft, pilots, and repairmen. The new certification addresses advances in sport and recreational aviation technology, and provides pilots with safe and cost-effective access to a growing segment of aviation. The new sport pilot certificate, which allows pilots to fly light-sport aircraft, is obtained with approximately 20 hours of flight training. In addition, sport pilots would only need either a third class medical certificate or a valid state driver's license to fly. The new rule will greatly reduce the barriers to becoming a pilot and an aircraft owner, thereby boosting general aviation activity and light aircraft sales.

Table 3-10 compares the projected national active aircraft fleet mix forecast for the year 2003 and 2015. The numbers that stand out in the table are the average annual growth rate for turboprop and turbojet aircraft at a rate of 2.82 percent and other at a rate of 2.17 percent. Single-Engine and multi-engine aircraft increased at a rate of 0.25 percent. Despite the significant increase in turbojet and other aircraft, single-engine and multi-engine aircraft still constitutes over 70 percent of the national active general aviation aircraft in 2015.

TABLE 3-10
FAA PROJECTED NATIONAL ACTIVE AIRCRAFT FLEET

Aircraft Type	2003	Overall Share	2015	Overall Share	Average Annual Growth Rate
Single-Engine - Piston	113,960	53.91%	117,460	50.89%	0.25%
Multi-Engine- Piston	48,840	23.10%	50,340	21.81%	0.25%
Turboprop	7,450	3.52%	10,400	4.51%	2.82%
Turbojet	7,450	3.52%	10,400	4.51%	2.82%
Rotorcraft	6,800	3.22%	7,400	3.21%	0.71%
Other*	26,900	12.72%	34,800	15.08%	2.17%
Total	211,400	100.00%	230,800	100.00%	1.68%

Note: An active aircraft is one having a current registration that was flown at least one hour during the calendar year. Since the long range forecast does not segment piston and turbine engine categories, Single Engine and Multi Engine subcategories are given 70% and 30% split, respectively; Turbo Prop and Turbo Jet categories given equal 50% split.

** Other category includes experimental and light sport aircraft.*

Source: FAA Aerospace Forecast (Fiscal Years 2005-2016), 2006

Herlong Airport Projected Based Aircraft Fleet Mix

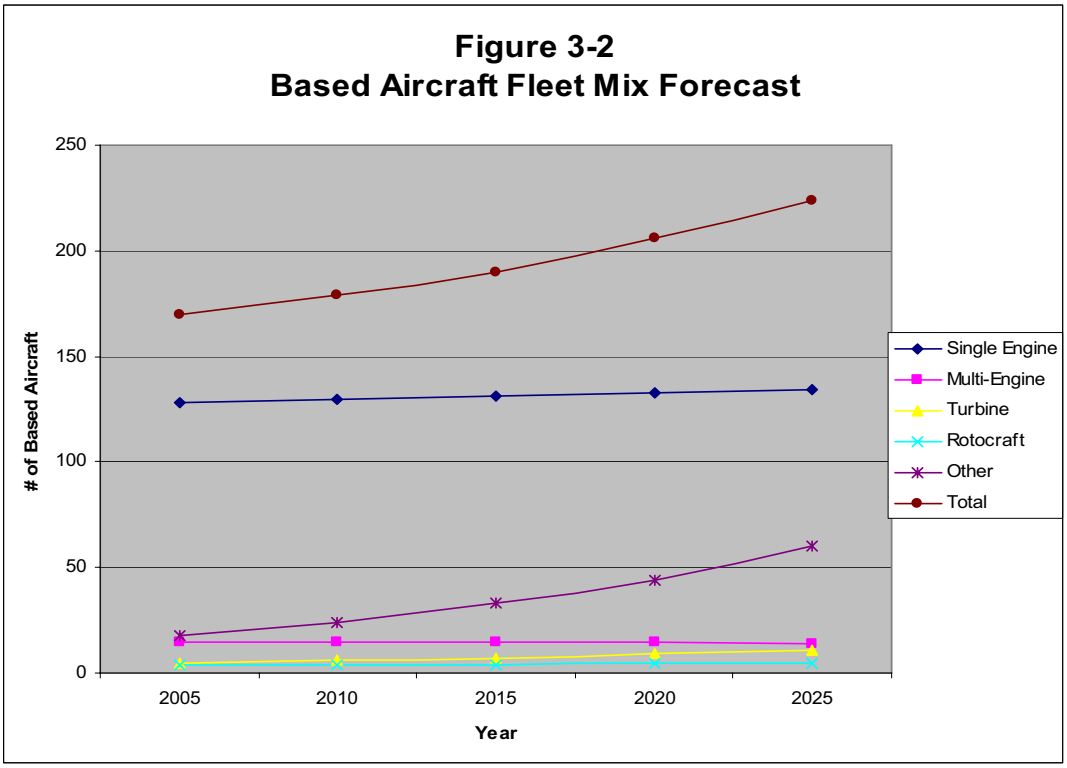
The base aircraft mix fleet was obtained from 2005 Airport Management records and from tenant surveys. This information confirmed the number of single-engine and multi-engine piston aircraft, turboprop and turbojet aircraft (Jets), helicopters (Rotorcraft) and experimental and gliders (Experimental/Other). From this data, a percentage breakdown for each category was determined. These percentages were then adjusted to reflect national fleet mix trends. The national trend indicates what is expected in the general aviation segment as a whole. Applying these percentages to the based aircraft forecasts provided the fleet mix forecast through the year 2025 as shown in **Table 3-11**.

TABLE 3-11
HEG PROJECTED BASED AIRCRAFT FLEET MIX

	Single-Engine		Multi-Engine		Jet*		Rotorcraft		Experimental/Other		Total
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Base Year											
2005	128	75.29%	15	8.82%	5	2.94%	4	2.35%	18	10.59%	170
Forecast											
2010	130	72.63%	15	8.38%	6	3.35%	4	2.23%	24	13.41%	179
2015	131	68.95%	15	7.89%	7	3.68%	4	2.11%	33	17.37%	190
2020	133	64.56%	15	7.28%	9	4.37%	5	2.43%	43	21.36%	205
2025	134	59.82%	14	6.25%	11	4.91%	5	2.23%	60	26.79%	224

**Note: Jet includes turboprop and turbojet aircraft*
Source: The LPA Group Incorporated, 2006

Figure 3-2
Based Aircraft Fleet Mix Forecast



Source: The LPA Group Incorporated, 2006

FORECAST OF AIRCRAFT OPERATIONS

Aircraft operational activity at HEG for the twenty-year planning period was conducted for general aviation activity exclusively. Military operations are expected to remain unchanged at approximately 2,000 rotorcraft operations during the planning period. This information will provide an accurate image of future demand and, therefore, facility requirements at the Airport for the twenty-year planning period.

FORECAST OF GA (NON-MILITARY) AIRCRAFT OPERATIONS

Many elements of aviation make up the broad definition of general aviation activity. General aviation includes all segments of the aviation industry except for those conducted by commercial or military operators. Its activities include the training of new pilots, sightseeing, aerial photography, law enforcement, and medical flights, as well as business, corporate, and personal travel. The FAA defines an operation as either a single aircraft landing or takeoff. Under this definition, touch-and-go training procedures are considered two operations (one arrival and one departure) and are considered local operations.

Projection of General Aviation Operations using TAF

The first method that was used to determine the general aviation forecast over the planning period is the TAF. In the TAF, the FAA forecasts the future operations growth at individual facilities. The 2005-2025 FAA TAF indicates that there is a straight-line forecast projection for annual operations at HEG. Straight-line forecast projections are generally discounted as an accurate measurement of anticipated operational growth, however since HEG does not have an air traffic control tower from which operational activity could be retrieved, the TAF is used as a generally conservative source of forecast information and is shown in **Table 3-12.**

Projection of General Aviation Operations using FASP

The next method of extracting the general aviation forecast for the planning period is through the use of the FASP. The FASP forecasts the growth in general aviation operations in Florida. The 2004 FASP provides forecasts for the years 2005 through 2016, which show an average annual growth rate of 1.00 percent. This growth rate was used to extrapolate the numbers for the rest of the planning period. The results are depicted in **Table 3-12**.

Projection of General Aviation Operations Using Historical Growth

Another method of extrapolating projected growth is through the use of the historical average annual growth factor for the years 1998 through 2005. This linear growth rate of 1.89 percent presents aircraft operations at HEG for 2025 at 92,052. This forecast may be viable if moderate development occurs at the airport. The results of the extrapolation are shown in **Table 3-12**.

Projection of Operations per Based Aircraft Methodology

This method uses the average operations per based aircraft (OPBA) to project operations over the twenty-year planning period. Using the average operations per based aircraft from 1998 through 2005 provided an average annual OPBA of 506.

In addition, an OPBA forecast of future airport operations at HEG was also performed using the FAA's OPBA standard of 492 operations to based aircraft for NPIAS designated reliever airports as shown in Appendix 5 of AC 150/5300-13, *Airport Design*. Utilizing OPBA, a growth rate of 1.52 percent was obtained, which resulted in a forecast of annual operations equal to 113,293 for the year 2025, which is considered the higher end of the forecast of operations for HEG over the planning period.

The Selected GA Operations Forecast

Since, as stated above, each projection was based upon a valid predictor variable, an average growth rate of 1.13 percent was applied for the average number of operations across the sources mentioned previously, with the inclusion of the FAA TAF, since historic operations among these sources are similar. The FASP and based aircraft method projections seem to be most closely related to the accepted forecast. Thus, as shown in **Table 3-12,** *Forecast Annual General Aviation Aircraft*

Operations, and **Figure 3-3**, *Forecast Annual GA Aircraft Operations*, 79,002 GA operations are anticipated for the year 2025.

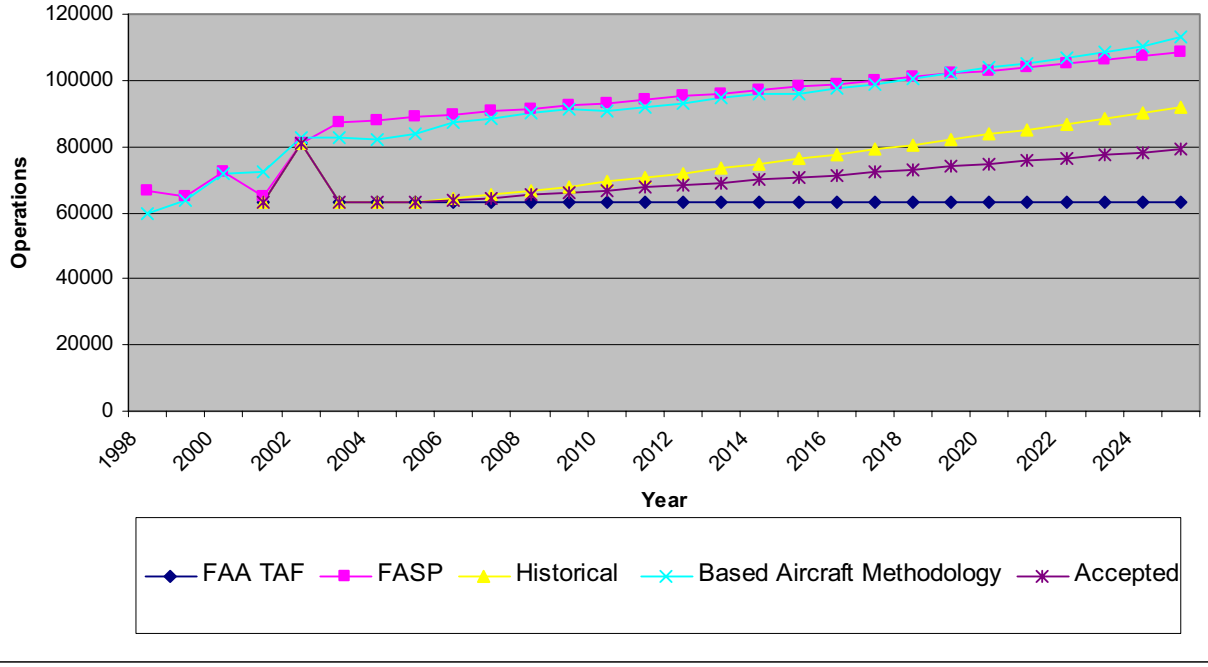
TABLE 3-12
FORECAST ANNUAL GENERAL AVIATION AIRCRAFT OPERATIONS

Calendar Year	2000 Master Plan Update	TAF	FASP	Historical	Based Aircraft Methodology	Accepted Forecast
Base Year						
2005[1]	82,180[2]	63,300	86,784	63,101	86,020[3]	63,101
Projected						
2010	93,280	63,300	93,276	69,294	90,533	66,748
2015	105,580	63,300	98,034	76,095	96,097	70,605
2020	119,480	63,300	103,035	83,562	103,683	74,686
2025	136,056	63,300	108,291	91,763	113,293	79,002
AAGR (%) 2005-2025	**2.59%**	**0%**	**1.00%**	**1.89%**	**1.52%**	**1.13%**

[1]Note: GA Operations = Total Operations -2000 military operations per year
[2]Note: Previous Master Plan forecast only 20 local military operations per year
[3]Note: Base Year = 170 based aircraft x 506 average operations per based aircraft
Source: The LPA Group Incorporated, 2006

Discussions with airport management confirmed that no distinct air taxi operations exist at HEG. Therefore, the approximate 300 air taxi operations reported in the TAF were added to the itinerant operations category. As a general rule, air taxi operations are those that cater to on-demand air service at airports that are typically Part 135 certified. Air taxi operators are not considered to be corporate or otherwise local general aviation. Rather, air taxi operations are itinerant operations with aircraft seating less than 19 passengers and operating a range no longer than 250 nautical miles.

Figure 3-3
Forecast of General Aviation Operations



Source: The LPA Group Incorporated, 2006

MILITARY OPERATIONS

Military operations at HEG are minimal due to the close proximity of Cecil Field, and consist of rotorcraft operations, primarily OH-58 Bell "Kiowa". Since Cecil Field has four runways, each with a pavement length greater than 8,000 feet, it is used by large and heavy civilian aircraft as well as most military aircraft operating within the City of Jacksonville. Nevertheless, limited military operations do occur at HEG and were, therefore, included in the forecast of total operations at HEG.

Historic military operations for the years 1995 through 1997 were unavailable. According to the 2000 MPU, twenty (20) operations per year were forecast throughout the planning period.

However, the FAA Terminal Area Forecast (TAF) reports 2000 to 2700 military operations for the years 2000 through 2003. Based upon information obtained from the Airport and FBO, this data appears realistic and is shown in **Table 3-13** for the years 2001-2005.

TABLE 3-13
Historic and Forecast Military Operations

Year	Airport Records	2000 MPU	2006 TAF	Preferred Forecast
1995	N/A	NA	NA	
1996	N/A	NA	NA	
1997	N/A	NA	NA	
1998	N/A	20	NA	
1999	N/A	20	NA	
2000	N/A	20	NA	
2001	2,000	20	2,000	2,000
2002	2,700	20	2,700	2,700
2003	2,000	20	2,000	2,000
2004*	2,573	20	2,000	2,573
2005*	2,240	20	2,000	2,240
Forecast				
2006		20	2,000	2,000
2010		20	2,000	2,000
2015		20	2,000	2,000
2020		20	2,000	2,000
2025		20	2,000	2,000

Source: HEG Management Records, 2000 Master Plan Update, FAA TAF 2006 & The LPA Group Incorporated, 2006.

Thus, based upon information obtained from JAA concerning military operations at HEG, a forecast of 2,000 military operations per year appeared realistic.

LOCAL VERSUS ITINERANT SPLIT

Aircraft operations are divided into the categories of local or itinerant. Local operations are those arrivals or departures performed by aircraft that remain in the airport traffic pattern, or are within sight of the airport. This covers an area within a 20 nautical mile radius of the airfield. Local GA operations are most often associated with training activity and flight instruction. Itinerant operations are arrivals or departures other than local operations, performed by either based or

transient aircraft that do not remain in the airport traffic pattern. Itinerant general aviation operations are typically comprised of private, business/corporate, and air taxi flight activity. Additionally, itinerant activity may include law enforcement and medical flights.

Based on information obtained from Airport management and user groups, the operational split between local and itinerant traffic has remained relatively stable over the past few years. The split between local and itinerant operations at HEG is noted as 43.37 percent itinerant GA, 3.43 percent itinerant military, and 53.20 percent local GA. It is expected the military operations at HEG will likely not exceed 1 percent of total operations and will continue to capture a dwindling proportion of total airport traffic. This future split of local and itinerant operations is depicted in **Table 3-14,** *Local vs. Itinerant Operations*.

TABLE 3-14
LOCAL VS ITINERANT OPERATIONS

	Itinerant Operations			Total Itinerant	Local Operations		Total Local	Total Operations
Year	Air Taxi	GA	Military*		GA	Military		
Base Year								
2005	0	28,340	2,240	30,580	34,761	0	34,761	65,341
Projected								
2010	0	**31,238**	**2,000**	**33,238**	**35,510**	**0**	**35,510**	**68,748**
2015	0	**33,043**	**2,000**	**35,043**	**37,562**	**0**	**37,562**	**72,605**
2020	0	**34,953**	**2,000**	**36,953**	**39,733**	**0**	**39,733**	**76,686**
2025	0	**36,973**	**2,000**	**38,973**	**42,029**	**0**	**42,029**	**81,002**
AAGR (%) 2005-2025	0	1.34%	-0.56%	1.22%	0.95%	0%	0.95%	1.08%

**Note: Military operations are related to Helicopter training performed at HEG*
Source: HEG Airport Management Records and The LPA Group Incorporated, 2006.

INSTRUMENT OPERATIONS FORECAST

HEG currently has one Global Positioning Satellite (GPS) based non-precision straight-in approach landing system on Runway 25, a circle-to-land approach using the Non-Directional Beacon (NDB), and a GPS based circle-to-land approach. The approaches are published in the U.S. Government Flight Information Publication – *U.S. Terminal Procedures Southeast (SE), Volume 3 of 4*. The current GPS approach can accommodate Category A and B aircraft with one-mile visibility minimums, and Category C aircraft with 1 ½ - mile visibility minimums, and Category D aircraft with 1 ¾ - mile visibility minimums. The ceiling for all categories of aircraft must be at least 600 feet. Similar visibility minimums are applicable for GPS circling procedures with the exception of

Category D aircraft that has a published minimum of two miles. Based on the airport's current runway lengths, the non-precision approach is adequate for the existing number of IFR operations. However, future airport development may necessitate upgrades of the instrument approach capabilities. This will be discussed in subsequent chapters.

FAA Air Traffic Activity Data System (ATADS) is the official source of historical air traffic operations for center, airport, instrument, and approach operations at towered airports. Since there is no ATCT at HEG, no historical data was available from the FAA ATADS database. According to the FAA TAF, *January 2005 Report,* instrument operations were reported as zero.

However, further analysis of climatic data provided from the National Oceanic and Atmospheric Administration (NOAA) showed that IFR weather occurs approximately 9 percent of the time. Of that 9 percent, four percent of the time weather conditions require airport closure. As a result, IFR instrument conditions are estimated to occur approximately 5 percent of the time which was used to forecast instrument operations through the twenty year planning period as shown in **Table 3-15**.

TABLE 3-15
PROJECTED ANNUAL INSTRUMENT OPERATIONS

Year	IFR Operations	Percent	Total Operations
Base Year			
2005	3,267	5%	65,341
Forecast			
2010	3,437	5%	**68,748**
2015	3,630	5%	**72,605**
2020	3,834	5%	**76,686**
2025	4,050	5%	**81,002**

Source: The LPA Group, 2006

PEAK ACTIVITY FORECAST

Aircraft operations and the number of based aircraft have periods of heightened activity. These peak periods occur on a fairly regular basis and are caused by external influences in the region and market area. One such influence is favorable weather conditions, which often creates peak periods of operations.

Due to the lack of an air traffic control tower (ATCT) on the airfield, peak operations were determined through the most reliable methods possible, namely fuel records. Through discussions with the fixed base operator (FBO) and analysis of 2004 fuel receipts, peak activity occurs in May for Avgas sales and July for Jet A sales. By utilizing the peak percentage of fuel sales for these

months, peak operations for piston aircraft were determined to be 35 percent higher than average per month whereas peak operations for jet aircraft were determined to be 32 percent higher than average.

However, since jet operations at HEG currently represent such a small fraction of total operations, the peak month will be based upon Avgas sales. This equates to a total of 8,437 operations during the peak month in 2004. The average day is then obtained by dividing the peak month by the average days in a month (30.42). The peak hour is then calculated at 35 percent of the average day of the peak month. By utilizing this formula, the peak hour at HEG for 2004 is 97 operations. Peak operations will be forecast through the planning period and discussed in greater detail in a later section.

Annual projections generally provide a good overview of the activity at an airport, but may not reflect operational characteristics of a facility. As such, peak forecasts are developed based on the fact that annual demand is typically not equally distributed throughout the entire year. In many cases, facility requirements are not driven by annual demand, but rather by the capacity shortfalls and delays experienced during peak times.

Peak operational activity such as peak month, average day of the peak month (ADPM), and peak hour forecasts are used in planning facility sizing and to determine the Airport's ability to accommodate projected demand. The projections for future peak operations at the Airport are shown in **Table 3-16,** *Forecast Peak Activity*.

TABLE 3-16
FORECAST PEAK GENERAL AVIATION ACTIVITY ONLY

Calendar Year	Total GA Ops*	Peak Month/GA Ops	Peak Month	Average Day/Peak Month	Average Day	Peak Hour/Average Day	Peak Hour
Historic							
2005	63,101	**2.96%**	**1,868**	**3.27%**	**61**	**15.00%**	**9**
Projected							
2010	66,748	**2.96%**	**1,976**	**3.29%**	**65**	**15.00%**	**10**
2015	70,605	**2.96%**	**2,090**	**3.30%**	**69**	**15.00%**	**10**
2020	74,686	**2.96%**	**2,211**	**3.30%**	**73**	**15.00%**	**11**
2025	79,002	**2.96%**	**2,339**	**3.29%**	**77**	**15.00%**	**12**

**Note: Does not include military activity*
Source: The LPA Group Incorporated, 2006.

Summary

Tables 3-17, *Comparison of TAF and Airport Forecasts***,** and **Table 3-18,** *Airport Planning Forecasts***,** provide a summary of the activity forecast for HEG. Overall the current activity at the Herlong is expected to show growth throughout the forecast period. In summary, the data and methods used to forecast aviation demand elements for the Airport are consistent with those used by the FAA and other airports located in the State of Florida and therefore, accurately reflect current activity trends of the surrounding region and nation.

TABLE 3-17
COMPARISON OF TAF AND AIRPORT OPERATIONS FORECAST

	Year	Airport Forecast	TAF	(% Difference)
Total Operations				
Base yr.	2005	65,341	65,300	0.06%
Base yr. + 5yrs.	2010	68,748	65,300	5.28%
Base yr. + 10yrs.	2015	72,605	65,300	11.19%
Base yr. + 15yrs.	2020	76,686	65,300	17.44%
Base yr. + 20yrs.	2025	81,002	65,300	24.05%
AAGR (%) 2005-2025		1.08%	0%	

Source: The LPA Group Incorporated, 2006.

TABLE 3-18
AIRPORT PLANNING FORECASTS
FORECAST LEVELS AND GROWTH RATES

	Base Year: 2005						Average Annual Compound Growth Rates				
	Base Yr. Level	Base Yr. + 1yr.	Base Yr. + 5yrs.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Base Yr. + 20yrs.	Base yr. to +1	Base yr. to +5	Base yr. to +10	Base yr. to +15	Base yr. to +20
Operations											
Itinerant											
Air Carrier	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Air Taxi	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
General Aviation	28,340	29,865	31,238	33,043	34,953	36,973	5.38%	1.97%	1.55%	1.41%	1.34%
Military	2,240	2,000	2,000	2,000	2,000	2,000	-10.71%	-2.24%	-1.13%	-0.75%	-0.56%
Total Itinerant Operations	30,580	31,865	33,238	35,043	36,953	38,973	4.20%	1.68%	1.37%	1.27%	1.22%
Local											
General Aviation	34,761	33,949	35,510	37,562	39,733	42,029	-2.34%	0.43%	0.78%	0.90%	0.95%
Military	0	0	0	0	0	0					
Total Local Operations	34,761	33,949	35,510	37,562	39,733	42,029	-2.34%	0.43%	0.78%	0.90%	0.95%
TOTAL OPERATIONS	**65,341**	**65,814**	**68,748**	**72,605**	**76,686**	**81,002**	0.72%	1.02%	1.06%	1.07%	1.08%
Instrument Operations	3,267	3,300	3,437	3,630	3,834	4,050	1.01%	1.02%	1.06%	1.07%	1.08%
Peak Hour Operations	9	9	10	10	11	12	1.64%	1.28%	1.24%	1.20%	1.17%
Cargo/Mail (Exported and Imported Tons)	0	0	0	0	0	0	0	0	0	0	0
Based Aircraft											
Single Engine (Piston)	128	128	130	131	133	134	0.24%	0.24%	0.24%	0.24%	0.24%
Multi Engine	15	15	15	15	15	14	-0.21%	-0.21%	-0.21%	-0.21%	-0.21%
Turbine	5	5	6	7	9	11	3.78%	3.78%	3.78%	3.78%	3.78%
Helicopter	4	4	4	4	5	5	1.14%	1.14%	1.14%	1.14%	1.14%
Other	18	20	24	33	44	60	11.11%	6.19%	6.19%	6.19%	6.19%
TOTAL	170	173	179	190	205	224	1.48%	1.03%	1.14%	1.26%	1.39%
GA Operations Per Based Aircraft (OPBA)	384	381	384	382	374	362	-0.70%	0.00%	-0.05%	-0.18%	-0.30%

Source: The LPA Group Incorporated, 2006.

CHAPTER FOUR

Airfield Demand/Capacity Analysis & Facility Requirements

INTRODUCTION

A key step in the master plan process is the determination of airport facility requirements to allow airside and landside evolution throughout the planning period. By comparing existing conditions to predicted growth projections, based upon existing and future aircraft usage, the airport can define requirements for runways, taxiways, aprons, terminal facilities, aircraft storage, and other related facilities to accommodate planned growth over the short-, intermediate-, and long-terms. As a result, the demand/capacity analyses aid in the identification of airport deficiencies, surpluses and opportunities for future development.

This chapter, therefore, evaluates the ability of existing facilities at the Herlong Airport (HEG) to meet both forecast planning activity levels, as shown in **Chapter 3**, *Projection of Aviation Demand*, as well as meet anticipated aircraft group category demand. Thus, the airfield demand/capacity analysis seeks to identify at what point, if any, during the 20-year planning period that an unacceptable level of delay would be experienced by airport users. This analysis compares the forecast annual aircraft operations to a theoretical airfield capacity. If a shortfall is identified, airfield improvements may be required to accommodate future demand. The Federal Aviation Administration (FAA) has developed a standard methodology in FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*, to determine this theoretical airfield capacity, termed Annual Service Volume (ASV). This methodology accounts for the most common airfield layouts observed at U.S. airports. The *Capacity* AC provides a systematic approach for determining the hourly runway and annual airfield capacities, as well as the projected average hourly and annual delays. Each of these was calculated for existing conditions as well as for key study years during the 20-year planning period; the results of which are described in the following sections.

General

An essential step in the process of predicting airport needs is the determination of an airport's current capacity to accommodate anticipated demand. There are two inter-related types of aviation demand: Operational Demand and Aircraft Group Category Demand. Each of these demand types affects capacity and development at an airport. Demand associated with operational capacity is determined through an analysis of the ASV. The ASV determines an airport's annual capacity based upon historic and forecast

operations and fleet mix. It does not take into account, however, significant changes in aircraft group categories, which do not historically or currently exist at an airport. This is a deficiency in the airport capacity analysis. ASV only accounts for deficiencies in runway use, aircraft fleet mix, weather conditions, etc. that would be encountered based upon the existing aircraft group category and usage.

In order to compensate for this deficiency, capacity and demand based upon the potential aircraft group category was determined. The Airport Group Category demand analysis evaluates not only the existing fleet mix, but also anticipated future fleet mix based upon a variety of external and internal factors unique to each particular airport. In the case of HEG, potential changes in roadway infrastructure, development within the region, existing demand by more sophisticated general aviation aircraft, and the introduction of small light jet aircraft, all impact airport infrastructure, such as runway length, strength, navigational aids (NAVAIDS), aircraft storage facilities, etc.

Airport Reference Code

According to FAA Advisory Circular (AC) 150/5300-13, *Airport Design,* airports are designated specific design standards that reflect what is identified as the Airport Reference Code (ARC). The ARC is a coding system that coordinates airport design criteria with the characteristics of the aircraft intended to operate at the airport. Two components make up the ARC—aircraft approach category and airplane design group. The first component, aircraft approach category, refers to an aircraft's approach speed and is generally a factor of the aircraft's operational characteristic. The second component, airplane design group, is a physical characteristic depicted by a Roman numeral and specifically relates to the aircraft's wingspan. Whereas the aircraft approach category affects runway design characteristics, the airplane design group affects the physical and design attributes of taxiways, taxi lanes and aprons.

Critical Aircraft

Determination of the critical aircraft is fundamental in developing an airport's design criteria as well as the development of the ARC. Characteristically, the critical aircraft is defined as the most demanding aircraft (highest approach speed and longest wingspan) that utilizes the airport on a regular basis. FAA Order 5090.3C*, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, defines substantial use as scheduled commercial service or at least 500 total aircraft operations a year. Further, the critical aircraft reference code is that which represents the lowest maximum allowable crosswind.

TABLE 4-1 AIRCRAFT APPROACH CATEGORIES	
Category	**Approach Speed (knots)**
A	< 91
B	91 – 120
C	121 –140
D	141 – 166
E	≥ 166
Source: FAA AC 150/5300-13	

TABLE 4-2 AIRCRAFT DESIGN GROUPS	
Design Group	**Wingspan (feet)**
I	< 49
II	49 – 78
III	79 – 117
IV	118 – 170
V	171 – 213
VI	214 – 262
Source: FAA AC 150/5300-13	

Facility Design Criteria

As previously identified in Chapter 2 of this Master Plan Update, the ARC is used to determine the standards and dimensions of the critical surface and separations of the airfield facilities. Based upon current aircraft operations which include aircraft such as the Citation II and the Super King Air 300, the current ARC at HEG is a B-II. A B-II category aircraft represents the most demanding aircraft or family of aircraft accounts for at least 500 total operations per year. Later in this analysis, anticipated changes in the GA fleet mix, including such aircraft as the Gulfstream II and III as well as Citation 10, in conjunction with the forecast increase in turbine operations may require the design criteria to increase from a B-II to a C-II designation. Therefore, by providing adequately sized facilities to accommodate the range of aircraft types projected to use HEG throughout the twenty-year planning period, the airport can exploit the benefits of maximizing airport services and their utilization.

AIRSPACE CAPACITY

Airspace capacity at an airport can be impacted when the flight paths of air traffic at nearby airports, or local navigational aids (NAVAIDS), interact to affect operations at the study airport. Additionally, obstructions near or in the approaches to an airport that require aircraft to alter flight paths to avoid the

obstruction can limit the number of aircraft processed, and adversely affect airspace capacity. Therefore, a review of the obstructions, airports, special use airspace and associated approach procedures that surround HEG was completed to determine airspace capacity. **Figure 4-1** illustrates the overall airspace surrounding HEG as depicted in the FAA Jacksonville Sectional Aeronautical Chart.

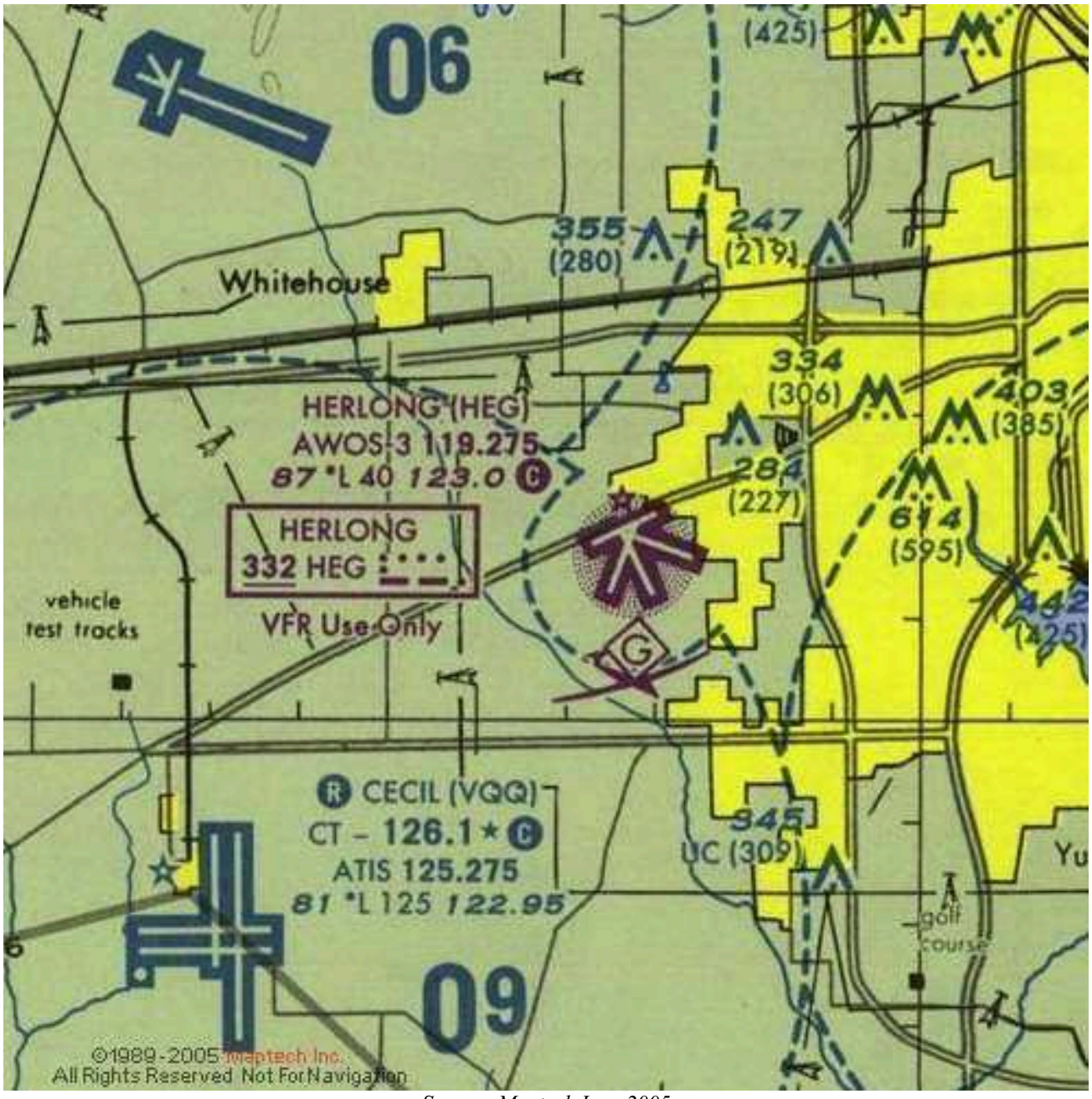
Airspace capacity is an essential element of any airport, especially with respect to maintaining existing and proposed operational characteristics. Since HEG does not have an operating control tower, the airfield is considered uncontrolled and operates within Class G and E airspace categories.

Class G airspace is a mantle of low lying airspace beginning at the surface. Class G is airspace that is completely uncontrolled and is limited to VFR operations. Class G airspace is a low lying blanket of uncontrolled airspace which only ends when it meets Class B, C, D or E airspace. At HEG, the ceiling of the Class G airspace is 700 feet AGL. As such, training aircraft and ultra-light activity may remain within the pattern without the need to maintain constant two-way radio communication with other aircraft in the area.

Above 700 feet AGL, the airspace is considered to be Class E airspace up to 18,000 MSL. Class E airspace is generally that controlled airspace that populates those sections of airspace between Class A, Class B, Class C, Class D, and Class G. There are Class E airspace areas that serve as extensions to Class B, Class C, and Class D surface areas designated for an airport. Such airspace provides controlled airspace to contain standard instrument approach procedures without imposing a communications requirement on pilots operating under VFR. Similarly to most non-towered airports, this type of Class E airspace surrounds HEG. It is important to note, however, that to the northwest, southwest and southeast, Class D airspace related to Cecil Field, NOLF Whitehouse and Jacksonville Naval Air Station surrounds HEG. Furthermore, northeast of the Airport is Class C airspace related to Jacksonville International Airport operations. Undoubtedly, the complex airspace requires careful planning especially if the roles of neighboring airports change.

Cecil Field, NOLF Whitehouse, and Jacksonville Naval Air Station all operate under Class D airspace. Class D airspace is controlled airspace that extends upward from the surface and continues to an elevation of 2,600 feet MSL. This ceiling, however, varies depending on the elevation of the airport. This airspace surrounds only those airports with an operational control tower, where pilots are required to establish and maintain two-way radio communications with the ATC facility providing air traffic control services prior to entering the airspace. No separation services are provided to pilots of VFR aircraft, and pilots operating under VFR must still use “see-and-avoid” procedures for aircraft separation.

Figure 4-1, Jacksonville Sectional

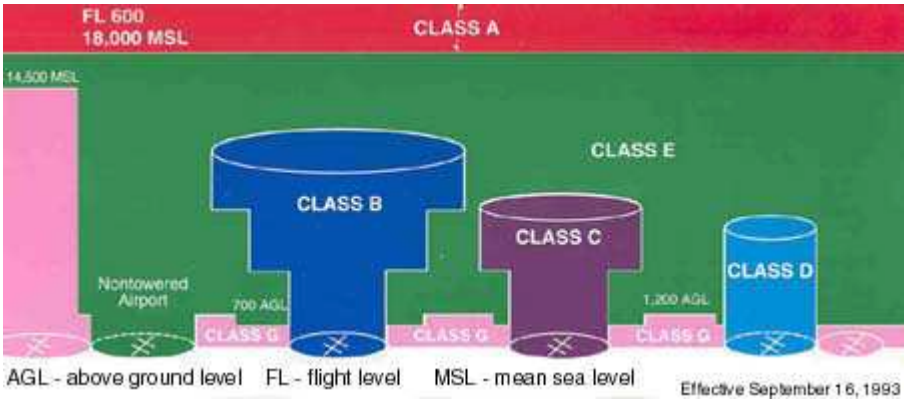


Source: Maptech Inc., 2005

HEG lies within the service area of the Jacksonville Approach/Departure Control facility and the Terminal Radar Approach Control (TRACON) which provides radar coverage within the vicinity. The Jacksonville Air Route Traffic Control Center (ARTCC) controls all air traffic enroute to or from the Jacksonville airspace area. Since the last master plan, the capacity of the airspace surrounding HEG has neither increased nor decreased significantly. Overall, the airspace for the airport is not currently impacted or constrained by any of the other airports in the region, except Cecil Field. This, however, does not remove the potential for some occasional airspace conflict associated with operations at the other facilities or associated obstructions. While none of these facilities have a severe direct airspace conflict, the potential application of additional instrument approaches will require careful planning.

Figure 4-2, *U.S. Airspace Classes*, outlines how the airspace classes relate.

Figure 4-2, U.S. Airspace Classes



Source: Federal Aviation Administration, Air Traffic Control Division, 2000

Though the airspace surrounding HEG is limited to some degree by military special use airspace (SUA) and commercial airspace associated with Jacksonville International Airport (JIA), it does not restrict the Airport's operating capacity. It was determined as part of this analysis that forecast increases in aircraft operations at HEG will not exceed the airspace capacity in its existing configuration. Continued coordination between ARTCC, JIA, Cecil Field (VQQ), Whitehouse NOLF (NEN), Jacksonville NAS Towers (NIP), and the other airports in the region will ensure that safe and efficient operations continue, while maintaining the smallest amount of delay possible. However, limitations to potential instrument approach operations at HEG do exist, and could potentially restrict development on existing Runways 7-25 and 11-29. Such an instrument operation would require significant analysis and coordination to ensure that conflicts with other operations within the area are avoided. This will be considered in a greater degree within **Chapter 6**, *Airport Alternatives*. However, based upon existing conditions, there is currently no hazard to air navigation affecting HEG.

AIRFIELD CAPACITY

As discussed earlier, airfield capacity consists of two types of demand: operational capacity and aircraft group category demand. Airfield operational capacity is defined as the number of aircraft that can be safely accommodated on the runway-taxiway system at a given point in time. Delay is the difference between "constrained" and "unconstrained" aircraft operating time, usually expressed in minutes. As demand approaches capacity, individual aircraft delay is increased. Successive hourly demands exceeding the hourly capacity will result in unacceptable delays. Aircraft delays can still occur even when the total hourly demand is less than hourly capacity if the demand during a portion of that hour exceeds the capacity during that hour.

Aircraft group category demand/capacity is based upon the type of aircraft group category that can safely use the Airport based upon available airport facilities and infrastructure. This type of demand evaluates capacity in relation to potential opportunity costs in order to determine if significant demand for infrastructure development exists. If limiting infrastructure exists, i.e. runway length inadequate to accommodate potential aircraft group or groups demand for facilities, then it is likely that the Airport will loose its competitive edge in the marketplace.

Airfield Operational Capacity

Operational demand and capacity analysis of airfield or airside systems and facilities, such as the Airport's runways and taxiways, results in calculated hourly capacities for Visual Flight Rules (VFR) and IFR conditions. Additionally, an ASV, which identifies the total number of aircraft operations that may be accommodated at the Airport without excessive delay, was also calculated.

An airport's hourly runway capacity is the maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period. It should be noted that generally this hourly capacity cannot be sustained over long periods without substantially increasing delays. The hourly runway capacity is influenced by a number of factors, which are described below.

Since the magnitude and scheduling of user demand is relatively uncontrollable, especially at a general aviation (GA) airport, reductions in aircraft delay can best be achieved by improving airfield facilities to increase overall capacity. Airfield capacity is quantified by two calculable factors:

- Weighted hourly capacity (Cw): The theoretical number of aircraft that can be accommodated by the Airport in an hour, considering all runway use configurations.
- ASV: The Airport's theoretical annual operational capacity.

To determine Cw and ASV and conduct the capacity analysis, a number of prime determinates specific to HEG must be identified. These include:

- Meteorological conditions
- Runway use configuration
- Aircraft mix (based upon existing aircraft group demand)

- Percent arrivals
- T&G operations
- Exit taxiways

The FAA defines operational capacity as a reasonable estimate of the Airport's annual capacity that would be encountered over a year's time. The parameters, assumptions, and calculations required for this analysis are included in the following sections.

Airfield Characteristics

Runway Configuration

The number of runways at an airport and how they are positioned in relation to one another determines how many arrivals and departures can occur within an hour. For example, if an airport has two runways that are oriented parallel to each other then it is generally possible to have arrivals and departures to both runways at the same time, which is most often referred to as runway independence. However, if the two runways intersect, an aircraft departing on one runway must wait for operations on the other to be completed prior to starting its takeoff, most often referred to as runway dependence. HEG has no runways that intersect, however the way in which they are aligned creates runway dependency if both runways are in operational use at the same time.

The airfield configuration for HEG includes four paved runways, two of which are in use and two of which are closed. The primary runway, Runway 7-25, has a generally northeast to southwest orientation whereas Runway 11-29 is aligned northwest to southeast. The two runways form an offset V-shaped configuration where the approach ends of Runway 25 and Runway 11 do not intersect, but are, however, within close proximity to one another.

All runways maintain standard right hand traffic patterns mainly because of the military operations that exist to the south of the airport within Cecil Field's Class D airspace. These patterns primarily keep traffic to the north and east of the airfield. Due to the runway configuration, runway length and related traffic patterns, HEG typically operates both runways at any given time. Therefore, the capacity calculations in this chapter treat the Airport as a dual runway environment.

Since aircraft takeoff and land into the wind, the FAA recommends that sufficient runways be provided to achieve 95 percent wind coverage. This is calculated by using a 10.5 knot crosswind component for the smaller and lighter aircraft, while a 13 knot and 16 knot crosswind component is utilized for the larger, heavier, and jet aircraft. FAA AC 150/5300-13, *Airport Design* suggests that weather for a period of at least ten years be used to determine the wind coverage of an airport. The inventory chapter of this study evaluated the wind coverage for different meteorological conditions at the Airport based on ten years worth of data, with a slight interruption during that time. Based upon our analysis, Runway 7-25 provides the appropriate wind coverage (greater than 95 percent) for all aircraft that currently utilize the airfield. This means that FAA will provide funding support for only this runway and supporting taxiway lighting and signage.

Taxiway Configuration

The number of taxiways impacts the hourly runway capacity by influencing when an arriving aircraft will be able to exit the runway after slowing to a safe taxi speed. The *Capacity* AC defines optimum ranges for the distance a taxiway should be from the runway arrival end.

As mentioned in Chapter Two, both runways are equipped with full-length parallel taxiways, designated as Taxiways A and D. Taxiway A provides access from the thresholds of Runways 7 and 25 to both the West Ramp and East Ramp aprons of the airfield located on the north side. Taxiway D provides full access to Runway 11-29 as well as access to Runway 7-25 and Taxiway B. Both parallel taxiways have a runway-to-taxiway separation of 525 feet, which exceeds both the B-II (existing critical aircraft category) and C-II (anticipated critical aircraft category) separation requirements.

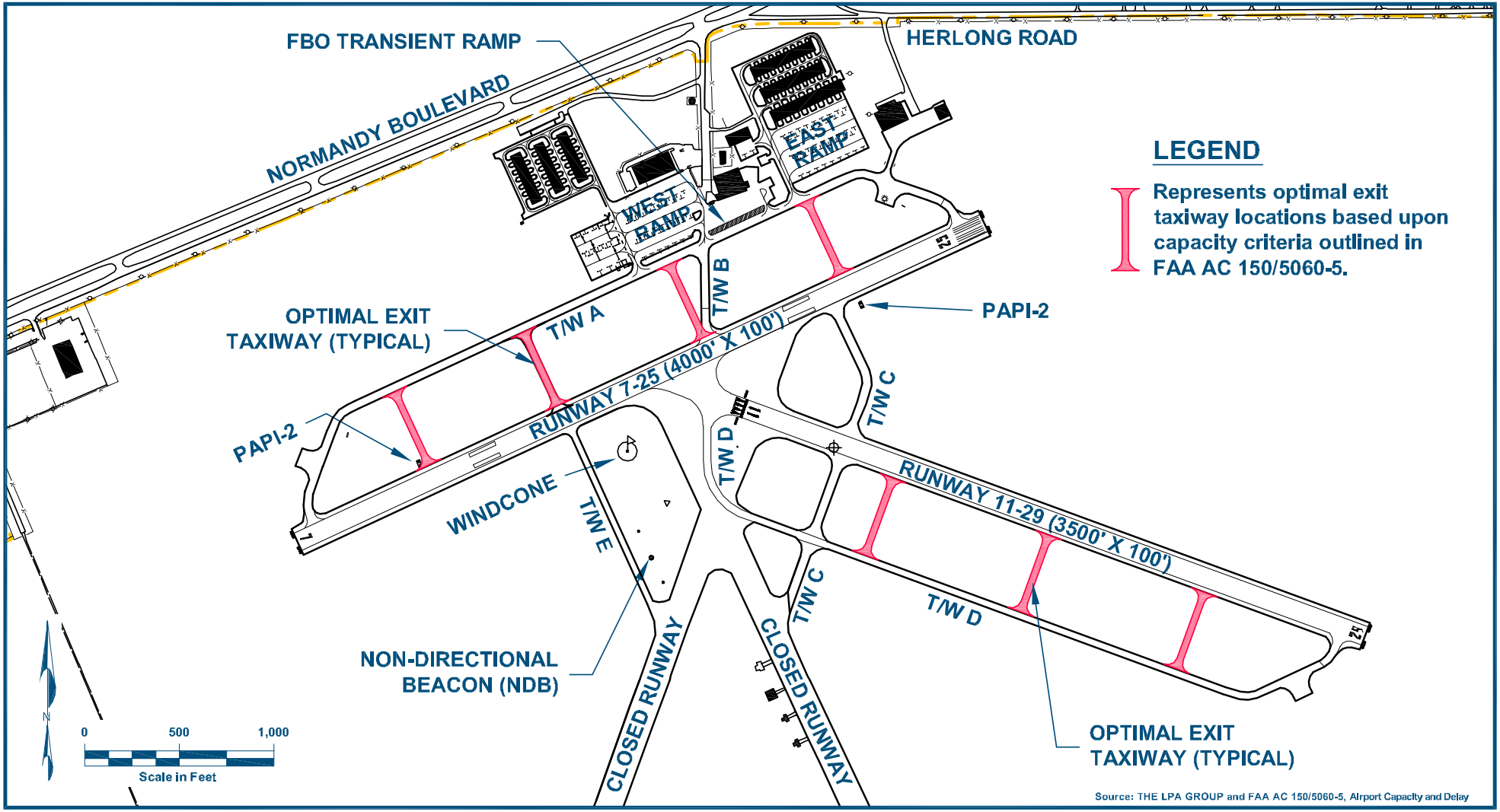
Taxiway B, connects the existing apron and terminal areas to Runway 7-25 and also provides access to and from Runway 11-29. Taxiway connector C provides access from the north side of the airfield, connecting Runway 7-25 to the 11-29 runway environments as well as Taxiway D and the south side of the airfield. There is a deficiency of exit taxiways on the runway system at HEG, and recommendations for the development of these taxiway components will be further discussed in the Alternatives chapter of this Master Plan Update. Existing exit taxiways are listed in **Table 4-3**, *Exit Taxiway Locations*, and correspond to the runways they serve.

To the south of the existing runways, former runway pavement exists that extend nearly 3,500 feet to the southwest and southeast. This pavement joins at a node where Taxiway D ends just south and east of the Runway 11 end. A closed taxiway connects the former runway pavements where substantial ultralight activity occurs.

Based upon demand and capacity requirements, exit taxiways provide a higher level of airport capacity since they limit the amount of time aircraft are required to remain on an active runway. Based on the FAA's criteria, the exit factor is maximized when a runway has four exit taxiways within a range determined by the operations using that runway. At HEG, this range is 2,000 feet to 4,000 feet from the landing threshold. Taxiway exit distances from the associated runway thresholds are shown in **Table 4-3**, *Airfield Diagram with Optimum Taxiway Ranges.*

JACKSONVILLE AVIATION AUTHORITY

Airfield Diagram with Optimum Taxiway Ranges



Source: THE LPA GROUP and FAA AC 150/5060-5, Airport Capacity and Delay

LPA

Figure 4-3

TABLE 4-3 EXIT TAXIWAY LOCATIONS		
Exit Taxiway	**From Runway 7 Threshold**	**From Runway 25 Threshold**
B	2,380'	-
A	3,875'	3,875'
	From Runway 11 Threshold	**From Runway 29 Threshold**
D	3,371'	3,643'
C	-	2,922'
Source: The LPA Group, Inc. 2006		

Aircraft Mix Index

In the *Capacity* AC, the FAA classifies aircraft at an airport based on their maximum certified operational weight. The mix index is a calculated ratio of the aircraft fleet based upon a weight classification system. As the number of heavier aircraft increases, so does the mix index. The hourly runway capacity decreases as the mix index increases because the FAA requires that heavier aircraft be spaced further apart from other aircraft for safety reasons. Over the planning period, a significant increase in larger and heavier jet operations is not expected, and thus the mix index will generally remain the same.

Knowing the operational fleet mix, it is possible to establish the mix index required to compute the airfield's capacity. The aircraft mix index is calculated based on the type or class of aircraft expected to serve an airfield. **Table 4-4** provides examples of typical aircraft for each of the FAA's four capacity classifications. The formula for finding the mix index is %(C + 3D), where C is the percentage of aircraft over 12,500 pounds, but less than 300,000 pounds and D is the percentage of aircraft over 300,000 pounds.

At HEG, the current aircraft mix includes only Class A and B aircraft. This trend is expected to continue over the entire planning period. The airport does see an increase in jet aircraft traffic in the latter part of the planning period. However, this increase in activity is likely limited to light jets associated with the Small Aircraft Transportation System (SATS) as well as light turboprop aircraft, both of which typically are less than 30,000 pounds. However, capacity constraints at Craig Airport and increased residential and business development in the area may cause Herlong to see the potential for a slight adjustment in its operational fleet mix. Nonetheless, since it is approximated that aircraft weighing over 12,500 pounds account for only 1 percent of total annual operations, the assumed fleet mix for HEG is calculated at 1 percent.

TABLE 4-4
FAA AIRCRAFT CLASSIFICATIONS

Aircraft Class	Max. Cert. Takeoff Weight (lb)	Number of Engines	Wake Turbulence Classification
A	12,500 or less	Single	Small (S)
B		Multi	
C	12,500 – 300,000	Multi	Large (L)
D	Over 300,000	Multi	Heavy (H)

Source: FAA AC 150/5300-13, Change 10

Runway Instrumentation

The capacity calculations for HEG include a main and secondary runway. The main runway, 07-25, provides GPS and NDB-A approach capabilities to Runway 25. Additionally, air traffic control (ATC) facilities, equipment, and services within the region are adequate to carry out operations in a radar and non-radar environment.

General Airspace Limitations

Herlong's role in the Jacksonville Aviation System is a VFR recreational, sport, flight training and light business aircraft general aviation airport. Its airspace is constrained by its proximity to Cecil Field, JIA, NAS Jacksonville and NOLF Whitehouse. The Airport is also not equipped with an air traffic control tower and has currently has only one instrument approach. These issues all reduce the airport's operational capabilities.

Operational Characteristics

Percentage of Aircraft Arrivals

The percentage of aircraft arrivals is the ratio of landing operations compared to the total number of operations at an airport for a specific period of time. This percentage is based upon the assumption that aircraft require more runway occupancy time for landing than takeoff. As a result, the 50 percent arrivals figure was determined using the FAA methodology for computing airfield capacity.

Sequencing of Aircraft Departures

Runways 7, 25, and 29 are equipped with dedicated run-up areas sufficient to allow for taxiing aircraft to pass simultaneously. Runway 11 has no dedicated area for aircraft run-ups. However sufficient pavement exists within the vicinity of the departure end of Runway 11 to allow aircraft run-ups, although this runway is not typically used the majority of the time. Since areas dedicated for run-up activity or a lack thereof cannot be modeled using the FAA's airfield capacity methodology, the airfield is considered to have no aircraft departure constraints.

Percentage of Touch-and-Go Operations

Touch-and-go operations play a significant role in the determination of overall airfield capacity. A touch-and-go is defined as two operations, a landing and takeoff performed consecutively are typically associated with flight training. FAA guidelines for calculating ASV require an estimate of

the percent of touch-and-go operations compared to total operations occurring at the airport. One touch-and-go maneuver typically takes less time than two operations conducted by two separate aircraft occupying a runway. Hence, airfields that have a higher percentage of touch-and-go operations typically have greater capacity than similar airports with a lower percentage of this type of maneuver. The number of touch-and-go operations normally decreases as the number of air carrier operations increases, demand for service and number of total operations approach runway capacity, and/or weather conditions deteriorate. Typically, touch-and-go operations are assumed to be between zero and 50 percent of total operations. Since no air traffic control service is provided at the airport, the previous master plan was consulted and reasonable assumptions were concluded from information obtained from airport management to estimate the number of touch-and-go operations at HEG. The previous master plan estimated that between 50 and 60 percent of total operations conducted at the airport are touch-and-go operations. This Master Plan Update assumes that this range is an accurate reflection of touch-and-go activity at HEG, and for the purposes of this study, 50 percent was used.

Meteorological Conditions

Meteorological conditions, i.e. wind, cloud ceiling and visibility, impact overall airfield capacity. Runway utilization is normally determined by wind conditions while the cloud ceiling and visibility dictates spacing requirements. Although Chapter Two, *Inventory of Existing Conditions*, provides a breakdown of the Jacksonville area wind characteristics, it was decided that since HEG does not have an operating ATCT, airport management and previous master planning efforts could reasonably estimate which runways accommodate most of the operational activity at the airport.

Based upon information obtained from the 2000 Master Plan Update report, 69 percent of operations occur on Runway 7-25 and 22 percent occur on Runway 11-29. The remaining nine percent refers to the times during which IFR conditions are in effect. Of this nine percent, based upon meteorological data obtained from National Climatic Data Center, a straight-in, non-precision instrument approach is flown to Runway 25 approximately five percent of the time. The remaining four percent refers to times when weather conditions exist below published minimums, and, therefore, the airport is closed. A breakdown of runway utilization is outlined in **Table 4-5**, *Runway End Utilization*.

Considering these various factors, the *Capacity* AC methodology was used to calculate the hourly capacities under both VFR and IFR conditions, as shown in **Table 4-6**. These two values were then used to calculate the weighted hourly runway capacity for each of the key study years. This weighted hourly runway capacity takes into account the percent of time each meteorological condition occurs. Over the planning period, there is no increase in the weighted hourly runway capacity. The judgment that supports this claim assumes that no significant increases or decreases in aircraft mix will occur at HEG over the planning period.

TABLE 4-5
RUNWAY END UTILIZATION

Runway End	Runway Use	Runway End Utilization
7	74% of total	17% of total
25		57% of total
11	22% of total	5% of total
29		17% of total
Weather conditions below published minimums occur approximately 4% of the time.		

Source: Airport Management and 2000 MPU, 2006.

The higher utilization of Runway 25 is attributed to the installation of a non-precision instrument approach system and its use by instrument and flight training operations. Likewise, the generally higher utilization of Runway 7-25 is perhaps best explained by its situational proximity to the aprons, T-hangar and storage facilities and fixed base operator (FBO) facilities. Longer taxi-times exist for aircraft that use Runway 11-29 since access to FBO facilities and apron parking requires aircraft to cross Runway 7-25.

There are three measures of cloud ceiling and visibility conditions recognized by the FAA in calculating the capacity of an airport. These include:

1. **Visual Flight Rules (VFR)** – Cloud ceiling is greater than 1,000 feet above ground level (AGL) and the visibility is at least three statute miles.

2. **Instrument Flight Rules (IFR)** – Cloud ceiling is at least 500 feet AGL but less than 1,000 feet AGL and/or the visibility is/are at least one statute mile but less than three statute miles.

3. **Poor Visibility and Ceiling (PVC)** – Cloud ceiling is less than 500 feet AGL and/or the visibility is/are less than one statute mile.

Essentially, each airport also has a fourth measure used to calculate the airport's capacity. That measure is based on the lowest minimum descent altitude, or decision height, and the minimum visibility published for an approach into the airport. HEG is equipped with a non-precision instrument approach to Runway 25. This approach is designed with a minimum descent altitude of 600 feet above ground level (AGL) and visibility minimum of one statute mile. However, when conditions are less than the published approach minima, the airport is closed to landing aircraft. Since this approach falls within the limits of the IFR category, the airport only has three measures: VFR, IFR, and below minimums (during which the airport is closed).

HEG experiences VFR conditions approximately 91.0 percent of the time, IFR conditions 5.0 percent of the time, and below the published approach minimums 4.0 percent of the time. These percentages are based on weather data collected for the Airport covering the most recent 10-year period.

Hourly Capacity of Runways

Hourly runway capacity measures the maximum number of aircraft operations that can be accommodated by the airport's runway configuration in one hour. Based on the FAA methodology, hourly capacity for runways is calculated by analyzing the appropriate VFR and IFR figures for the airport's runway configuration. From these figures, the aircraft mix index and percent of aircraft arrivals are utilized to calculate the hourly capacity base. A touch-and-go factor is also determined based on the percentage of touch-and-go operations combined with the aircraft mix index. These figures also consider a taxiway exit factor, which is determined by the aircraft mix index, percent of aircraft arrivals, and number of exit taxiways within the specified exit range.

For both VFR and IFR conditions, the hourly capacity for runways is calculated by multiplying the hourly capacity base, exit factor, and touch-and-go factor. This equation herein is detailed below:

$$\text{Hourly Capacity} = C^* \times T \times E$$

where: C^* = hourly capacity base
T = touch-and-go factor
E = exit factor

TABLE 4-6
CALCULATION OF HOURLY CAPACITY

Year	VFR Capacity Base (Operations/Hour)	IFR Capacity Base (Operations/Hour)	Weighted Hourly Capacity (C_w)
Base Year			
2005	158	59	116
Forecast			
2010	158	59	116
2015	158	59	116
2020	158	59	116
2025	158	59	116

Source: The LPA Group, Inc. 2006

An airport's mix index can substantially change the value of the hourly capacity base in the FAA capacity tables. However, since all of the planning years fall into the mix index range of 0 to 20 percent, there will be no change in the hourly capacities of the airport. A weighted hourly capacity for the airport is calculated by taking the VFR and IFR calculations and prorating them based upon Airport historical

data. These hourly capacity values were calculated for Herlong Airport at key years within the planning period as shown in **Table 4-6**. The calculated weighted hourly capacity was determined to be 116 operations. This figure was used to calculate annual service volume (ASV) as detailed in the following section. **Table 4-7** tabulates the hourly runway capacity calculation components, applicable weight factors, as well as percentage of runway use to determine the ASV.

Annual Service Volume (ASV)

The FAA *Capacity* AC uses the calculated weighted hourly runway capacity to determine a theoretical annual airfield capacity, which the FAA has defined as the annual service volume (ASV). The ASV estimates the annual number of operations that the airfield configuration should be capable of handling with minimal delays over a one-year period. This methodology takes into account that a variety of conditions are experienced at an airport throughout a year, including some high-volume and low-volume activity periods. **Table 4-8** shows the results of the ASV calculations for the base year of 2005 as well as for each five-year increment over the twenty-year planning period. Additionally, this table, in conjunction with **Figure 4-3,** shows the comparison of the projected annual operational demand to the theoretical ASV. According to guidelines in **FAA Order 5090.3B**, *Field Formulation of the National Plan of Integrated Airport Systems*, once the actual demand exceeds 60 percent of the calculated ASV planning studies should be undertaken to increase the airfield capacity. Due to the length of time it takes to implement some types of airfield developments, early planning facilitates the construction of capacity enhancing facilities to meet the anticipated demand. Based on the operational forecasts developed in **Chapter 3**, HEG will neither exceed the Airport's calculated ASV nor the 60 percent planning threshold during the twenty-year planning period. Thus, future improvements to the airfield do not consider issues associated with ASV capacity; however, other issues related to capacity shortfalls are considered in the facilities requirements section of this chapter.

$$\text{Annual Service Volume} = C_W \times D \times H$$

Where: C_W = weighted hourly capacity for the runway component, calculated by,

$$C_W = \frac{(C_1 \times W_1 \times P_1) + (C_2 \times W_2 \times P_2)...+...(C_n \times W_n \times P_n)}{((W_1 \times P_1) + (W_2 \times P_2)...+...(W_n \times P_n))}$$

C_x = hourly capacity

W_x = weighted factor

P_x = percent runway use

D = average daily demand during peak month

H = average peak hour demand during peak month

TABLE 4-7
HOURLY CAPACITY OF RUNWAY COMPONENT CALCULATION MATRIX

Runway Use Condition	Hourly Capacity Base (C*)	Touch and Go Factor (T)	Exit Rating (E)	Hourly Capacity (C* x T x E)	Weight Factor (W)	Percentage Use VFR	Percentage Use IFR
Takeoff 07 Landing 07 VFR	158	1.00	.90	142.2	1	17%	
Takeoff 07 Landing 07 IFR	0	0	0	0	4		0%
Takeoff 25 Landing 25 VFR	158	1.00	.79	124.82	1	52%	
Takeoff 25 Landing 25 IFR	59	1.00	1.00	59	4		5%
Takeoff 11 Landing 11 VFR	158	1.00	.79	124.82	1	5%	
Takeoff 11 Landing 11 IFR	0	0	0	0	4		0%
Takeoff 29 Landing 29 VFR	158	1.00	.79	124.82	1	17%	
Takeoff 29 Landing 29 IFR	0	0	0	0	4		0%
Airport Closed	0	0	0	0	25		4%
TOTAL						**91%**	**9%**

Notes:
Maximum Hourly Capacity = 142.2
Hourly Capacity = (Column 2 x Column 3 x Column 4)
Weighted Hourly Capacity Cw=E (Column 5 x Column 6 x Column 7)/E(Column 6 x Column 7) = 116
Daily Demand Ratio (D) with Aircraft Mix Index of 0% to 20%
- *65,300/295 = 221.35*

Hourly Demand Ratio (H) with Aircraft Mix Index of 0% to 20%
- *278.3/35 = 7.95*

Annual Service Volume (Cw x D x H) = 204,128
The weight factor calculation for both IFR and VFR conditions is as outlined in the methodology found in FAA AC 150/5060-5, Airport Capacity and Delay, Table 3-
Since Runway 25 is equipped with GPS, the majority of IFR operations are performed on this runway

Source: The LPA Group Incorporated, 2006

Annual service volume is calculated by multiplying the weighted hourly capacity for each runway configuration, C_W, with average daily demand during the peak month, D, and average peak hour demand during the peak month, H. Weighted hourly runway capacity, C_W, is a function of hourly runway capacity (C_n), the weight applied to that capacity (W_n), and the percentage of time that runway is in use

(P_n). An eight variable function was used to determine C_W as each runway configuration schematic during both VFR and IFR was used in the calculation. As a result, the runway component hourly capacity considers all weather scenarios during times the airport is open to traffic. The calculated weighted hourly capacity for HEG is 116 operations.

Due to the integrated nature of the ASV calculation, precise methodologies were followed as outlined in FAA AC 150/5060-5, *Airport Capacity and Delay*, to obtain a theoretical airfield capacity of 204,128 annual operations. This number is representative of the published theoretical capacity of an airfield with a similar runway configuration for HEG, which is published in the Capacity AC as 260,000 operations. Although not exact, this estimation is based upon operational information obtained from the FAA TAF and may actually be slightly higher due to the variance in base year operations. Therefore, it is justified that the ASV calculation in this Master Plan Update best represents the capacity of the airfield at HEG. Accordingly, subsequent recommendations for facility requirements are based upon this calculation as well as those previously detailed in the forecast chapter.

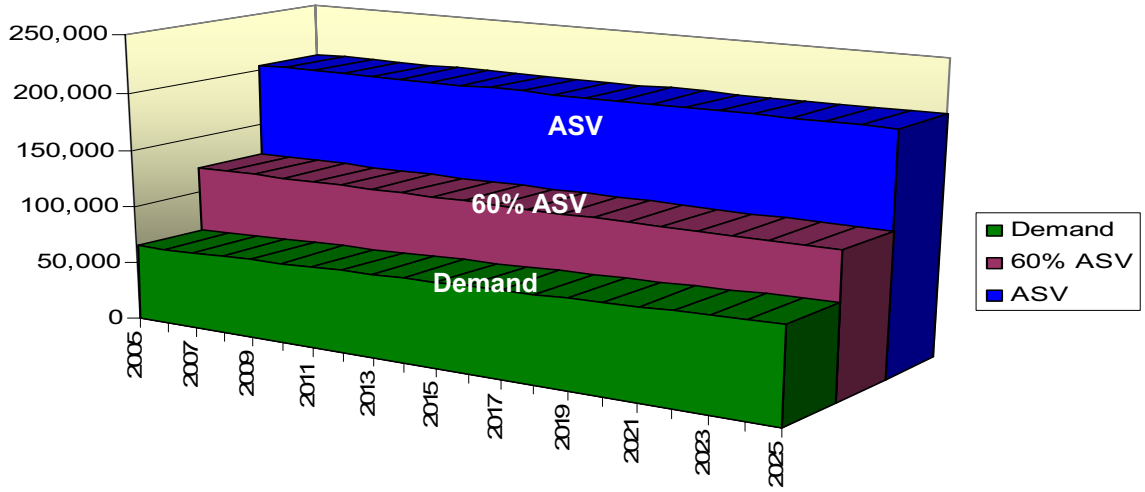
TABLE 4-8
ANNUAL AIRFIELD CAPACITY

Year	Annual Operations	Annual Service Volume	Capacity Level
Base Year			
2005	65,341	204,128	31.99%
Forecast			
2010	68,958	204,128	33.78%
2015	72,828	204,128	35.67%
2020	76,921	204,128	37.68%
2025	81,251	204,128	39.80%

Source: The LPA Group Incorporated, 2006

Table 4-8 depicts the forecast annual operations with the anticipated unchanging ASV. The airfield will marginally lose capacity throughout the planning horizon without additional capacity, representing a reduction in 24.45% in theoretical annual service volume by 2025. Important to note in this table is the consideration for growth in annual operations as determined in the forecast chapter. Whereas ASV is calculated to remain constant over the planning period, it is assumed that variability in the number of annual operations is inevitable. Therefore, capacity levels should be recomputed as final and accurate counts of total annual operations become available. As well, a new turf runway expected to accommodate the facility's ultralight and experimental aircraft thus increasing the airfield's ASV, albeit not as significantly as a paved runway. Accommodations should be reserved for this scenario as well.

FIGURE 4-4
CAPACITY LEVEL COMPARISON



Source: The LPA Group, Inc. 2005

Aircraft Group Capacity Demand

Based upon operational demand alone, HEG should not plan for additional runway capacity enhancing projects until beyond the end of the twenty-year planning period. However, based upon discussions with JAA/Herlong Aviation, the local fixed based operator (FBO), and JAA management, HEG's role is likely to evolve as a result of new technology and user demand, and, therefore, airfield facility improvements will likely be required in the mid- to long-term.

As a result, an aircraft group capacity demand analysis was performed. Aircraft group capacity demand is based upon a group or groups of aircraft that have or are anticipated to use HEG in the future if certain infrastructure improvements are made. According to the 2000 Airport Layout Plan, the existing ARC for HEG is Category B-II. However, use and demand for facilities by turbine aircraft, such as Learjet 24/25 and Gulfstream III, typically with an ARC of C-I and C-II is expected to increase over the planning period. Based upon current information received from JAA and JAA/Herlong Aviation, use of C-I and C-II category aircraft (such as the Lear 25 and Gulfstream II) has been irregular as a result of runway length constraints. However, using data provided by the FBO, observations and fuel flowage data, it was determined that approximately ten (10) percent of total operations, approximately 6,530 operations, are associated with turbine-engine aircraft. Of that ten percent, approximately four (4) percent (or 260 annual operations) may be attributed to C-I and C-II category aircraft. Based upon the **FAA Aerospace**

Forecast, 2006-2015, turbine aircraft use is expected to increase by at least 2.8 percent per year. Applying the FAA average annual growth rate to HEG would result in turbine aircraft demand of approximately 16.96 percent (13,782 operations) of which conservatively 6.78 percent (approximately 935 operations) would be attributed to C-I and C-II category aircraft by the year 2025. It is anticipated that operations of more sophisticated jet aircraft will increase as a result of local business activity and anticipated capacity constraints at Craig Airport. Operators of more sophisticated and larger aircraft have stated that they would use the Airport if facilities were in place to meet their needs. Thus, the percentage of turbine operations associated with corporate aircraft, fractional ownership aircraft, air taxi, turboprop and turbojet GA aircraft, and some special use aircraft would likely increase beyond the forecast 16.96 percent.

Smaller aircraft operators seem to prefer the environment and facilities provided by HEG rather than Cecil Field. As a result, some operators use HEG, such as the Dassault Falconjets, Grumman Gulfstreams, Beech King Air's, Gates Learjet's, Cessna Citations, etc., even when their operations require weight restricted take-offs and landings due to HEG's shorter runways. At the time of this writing, based upon discussions with existing and potential users, JAA/Herlong Aviation, tenants, and JAA management, the number of aircraft in the B-II, C-I and to a limited extent C-II aircraft group category would likely increase if adequate runway length was available. In order to determine the anticipated effect of this demand on HEG, an opportunity cost analyses for each potential user was determined as shown in **Table 4-9**, *GA Daily Opportunity Costs*.

Corporate and General Aviation

As a member of the Jacksonville Aviation System, HEG's primary sources of funding are fuel sales and hangar rentals. However, many smaller, regional airports within the state benefit from non-aviation revenue sources. It is recommended, as part of the airport's development and diversification strategy, to develop a commerce park within its boundaries to attract aviation and non-aviation tenants.

Businesses can and do, to some degree, attract aircraft operations. Historically, aircraft operations at HEG increase significantly during Spring and late Fall coinciding with a variety of local events. In addition, attendees often fly larger aircraft, such as the Jetstream 31 and Learjet 25. However, due to limited runway length and instrument approach capabilities, many users who would like to use the Airport are prohibited from doing so.

As a result, potential income associated with this and similar operations at HEG are lost, representing lost opportunities or opportunity costs. Based upon the anticipated growth of the light jet and turbine aircraft market over the twenty-year planning period, operations associated with these type of aircraft are expected to represent 10% of the operational fleet in the year 2025. Again this number is somewhat deceiving since it is merely based upon historical data and does not consider the number of aircraft that cannot use the Airport due to facility, especially runway length limitations. Airport Management has and is currently having active discussions with potential users. Based upon these discussions, letters of interest are being obtained and are provided in **Appendix F** of this report. Based upon these letters and

discussions with Airport management, **Table 4-9** shows the type and estimated revenue generation from aircraft that could utilize the Airport if adequate runway length were available.

TABLE 4-9
GA DAILY OPPORTUNITY COSTS

Aircraft	ARC	MTOW	Passengers	Estimated Field Length[1] Required (ft)	Fuel Capacity (Gallons)	Estimated Fuel Revenue[2]	Estimated Daily Tie-Down Fees[2]	Estimated Nightly Hangar Rental Fees[2]
Learjet 28/29	B-I	15,000	6	4,201	1,800	$6,768	$10.00	$50.00
Citation Jet	B-I	11,850	7	3,615	600	$2,256	$10.00	$50.00
TBM 850	B-I	7,394	4	3,333	864	$3,249	$10.00	$50.00
SJ30-2	B-I	13,499	7	4,685	1,620	$6,091	$10.00	$50.00
Premier Jet	B-I	12,500	5	4,451	2,500	$9,400	$10.00	$50.00
Citation Excel	B-II	18,700	11	4,213	2,244	$8,437	$10.00	$50.00
Citation II	B-II	13,300	8	3,509	800	$3,008	$10.00	$50.00
Citation Ultra	B-II	16,300	11	3,732	1,450	$5,452	$10.00	$50.00
Jetstream 31	B-II	16,226	10	4,871	1376	$5,174	$10.00	$50.00
Beechjet 400	C-I	16,100	9	4,893	1,932	$7,264	$10.00	$50.00
Learjet 24	C-I	13,500	6	4,346	1,620	$6,091	$10.00	$50.00
Learjet 25	C-I	15,000	6	5,433	1,800	$6,768	$10.00	$50.00
Learjet 31A	C-I	17,000	8	4,002	2,040	$7,670	$10.00	$50.00
Gulfstream III	C-II	68,700	14	5,927	4193	$15,766	$10.00	$50.00
Falcon 900 EX	C-II	48,300	15	5,851	3134	$11,784	$10.00	$50.00
Citation X	C-II	36,100	13	6,033	1926	$7,242	$10.00	$50.00
Average				**4,568**		**$7,026**		

Note: Manufacturer Takeoff Length and Regional Guidance requirements adjusted for elevation, temperature and 50 foot obstacle using FAA Takeoff Length Model
2 Obtained from Airport: $3.76 per gallon Jet A; $10.00 tie-down fee and $50.00 hangar fee
Source: Aircraft Manufacturer data, FAA Runway Length Regional Guidance Letter, and The LPA Group Incorporated, 2006

Again, this table represents potential lost revenue to the Airport since the Airport will not obtain fuel sales, aircraft parking fees, aircraft storage fees, concession sales, etc. from these potential aircraft operations. The estimated field length requirement was calculated using aircraft manufacturer takeoff requirements at sea level and 59 degrees Fahrenheit adjusted for HEG's elevation, temperature on the hottest day (92° F) based upon National Climatic Data Center information over a 10-year period, and clearance over a 50-foot tall obstacle. Furthermore, based upon a new FAA Rule published in June 2006, a mandatory 15 percent landing distance safety margin is required for all Part 91K (fractional), 125, 121 and 135 jet operations.

As a result, in order for HEG to capitalize on this potential demand, either a 500-foot or greater extension to an existing runway or construction of a new runway would be required. The installation of a precision instrument approach on one or more runway end(s) would allow the Airport to support aircraft

during inclement weather conditions. This is evaluated in more detail within **Chapter 6**, *Airport Alternatives Analysis*.

Gliders and Other Potential Turf Runway Users

HEG is home to the North Florida Soaring Society, an airport glider organization. According to airport management, 2,700 annual operations in 2006 were attributed to glider aircraft representing approximately 4 percent of total operations. Based upon forecast operations and fleet mix and the airport's current configuration, approximately 4,156 operations are likely to be attributed to glider activity in 2025.

Both older GA aircraft, such as warbirds, tail draggers and glider aircraft use turf runways since they decrease the amount of wear on the aircraft by providing a softer landing surface. Further, a turf runway can also be used by smaller, lighter powered aircraft when necessary. Since HEG is promoted as Jacksonville's premier general aviation and sport flying airport, a turf runway may attract additional operations. Thus, at a minimum cost, the Airport could reap a variety of benefits associated with GA development including aircraft storage, hangar homes, etc. The development of a turf runway will also limit gliders from using Runways 7 and 25 and eliminate damage to runway and taxiway lighting as a result of low wing strikes by glider aircraft. Based upon discussions with existing and potential aircraft tenants and other GA users, a turf runway at HEG would be welcomed.

Turf runway alternative development is provided in Chapter 5, Airport Alternatives Analysis. As part of the analysis, preliminary cost estimates, operational benefits and revenue potential are identified. Thus, based upon successes at other airports and demand by current users at HEG, JAA will consider the cost and revenue potential associated with installing a turf runway *at HEG*. However, prior to design and construction, a cost-benefit analysis should be performed to identify potential on-airport and off-airport benefits related to the turf runway development.

Small Aircraft Transportation System (SATS)

According to research supported by the Federal Aviation Administration (FAA) and National Aeronautics and Space Administration (NASA), a significant need for a small aircraft transportation system currently exists. The Nation's 30 major airports are overwhelmed with increased air traffic, thus leading to frequent delays and cancellations. The SATS system would utilize the over 5,000 small airports already in place across the country and would allow air service to smaller communities.

Very light jet aircraft (VLJ) provide another source of potential demand at HEG. These high-performance aircraft, however, require less takeoff field length than traditional turbine aircraft and are far quieter. As a result, aircraft demand associated with smaller GA aircraft and VLJ aircraft could be met on an optimal runway field length of approximately 3,500 feet. This demand can be accommodated by the Airport at its current runway length; however, any improvements to runway length would provide the airport greater flexibility in accommodating both the existing and future fleet mix. It is anticipated

that the VLJs will come on line in the within the year while the SATS navigational program will be fully operational in the next 5 to 10 years.

ANNUAL AIRCRAFT DELAY

The average anticipated delay is based upon a ratio of the forecasted demand to the calculated ASV. This ratio is used as a guide for planning future airfield improvements. The FAA acknowledges in the *Capacity* AC that the level of delay that is acceptable to a particular airport may differ from the level deemed acceptable at a similar airport. It is important to note that it is not only the time delay that determines acceptability, but also the frequency of these delays.

Several methods exist for estimating anticipated delay levels. One method involves using a variety of charts in the *Capacity* AC to estimate the average delay per aircraft based upon the ratio of annual demand to ASV. This delay per aircraft would then be used to calculate the annual delay for all operations. Another method utilizes software developed by the FAA (*Airport Design Software, Version 4.2d*) to determine the projected delay values. For the efforts of this study after consulting with airport management and the type of operations that occur at HEG, delay is not considered a significant factor in the development of the airfield. Through 2025, the average delay per aircraft and total annual delay variables do not indicate that airport users will experience significant delays. It should be noted that this does not imply capacity related delays will not occur during times of peak activity.

SUMMARY OF AIRFIELD CAPACITY ANALYSIS

In estimating the capacity of the existing HEG operational areas, the primary elements of airfield capacity were examined to determine the Airport's ability to accommodate anticipated levels of aviation activity. The results indicate that:

- Airspace in the vicinity of the Airport does have limitations for additional instrument approach procedures, but will likely accommodate future aviation activity through coordination with local authorities.
- Additional IFR approach capabilities in a southeast-northwest orientation may be required to reduce existing approach minimums and improve IFR capacity.
- Runway orientation is adequate, based on existing and historical wind characteristics.

A summary of these results is given in **Table 4-10**. This analysis has shown that planning for an increase in airfield capacity based upon annual service volume is not required until demand approaches 60 percent. However, based upon the type and number of aircraft currently and expected to use the airfield over the twenty-year planning period, airfield facility improvements are justified. Based upon FAA Southern Region Guidance (as provided in Appendix C of this report) and Advisory Circular 150/5325-4A, Runway Length Requirements for Airport Design, the required runway length should be based upon the critical aircraft or group of aircraft expected to use the airport on a regular basis (approximately 500 operations annually). Therefore, based upon the FAA Takeoff and Landing

Requirements adjusted for elevation, temperature, runway slope and wet pavement conditions, the optimal length for Category B and C Business Jets is between 4,500 and 5,500 feet.

In addition, enhancements to the airfield that will improve safety, access, as well as airport function are addressed in the following section. It should be noted that if aviation activity exceeds that of the approved forecast, the need for airfield capacity and/or operational enhancements may be required. Facility improvements to address this potential shortfall, which could include additional taxiways or a new runway, are addressed in the next steps of this study. The following section, *Facility Requirements*, delineates the various facilities required to properly accommodate future operations levels. That information, in addition to the capacity analysis, provides the basis for formulating the alternative development scenarios for the airport, while ensuring that the new recommended development plan adequately accommodates long-term aviation requirements.

TABLE 4-10
SUMMARY OF AIRFIELD CAPACITY ANALYSIS

	2005	2010	2015	2020	2025
Hourly Runway Capacity					
VFR Capacity Base (Operations/Hour)	158	158	158	158	158
IFR Capacity Base (Operations/Hour)	59	59	59	59	59
Weighted Hourly Capacity	116	116	116	116	116
Annual Airfield Capacity					
Annual Operations	65,300	68,958	72,828	76,921	81,002
Annual Service Volume	204,128	204,128	204,128	204,128	204,128
Capacity Level	31.99%	33.78%	35.68%	37.68%	39.68%
Average Delay per Aircraft (Minutes)					
High	0	0	0	0	0
Low	0	0	0	0	0
Total Annual Operational Delay (Hours)					
High	0	0	0	0	0
Low	0	0	0	0	0

Source: The LPA Group, Incorporated. 2005

Capacity and demand requirements were determined for essentially all aspects of HEG's operations. These calculations, which are based on various components, should be regarded as generalized planning tools, which assume attainment of forecast levels as described in Chapter 3 as well as demand associated with various types of general aviation operations.

Should the forecasts prove conservative, proposed developments recommended as a result of the demand/capacity analysis should be advanced in schedule. Likewise, if traffic growth materializes at a slower rate than forecast, deferral of expansion would be prudent.

FACILITY REQUIREMENTS

During the facilities requirements phase of the master plan process, the major focal point is a comparison of the projected demand at HEG to the capacity of existing facilities to determine projected shortfalls. Doing so allows the airport to respond appropriately as demand grows over the 20 years covered in this study. Future facility improvements should not be driven by reaching the timeframe identified in the aviation forecasts, but rather by the actualization of the forecasted demand. Thus, future developments should not be undertaken until a certain demand level is reached. Doing so allows airport management to make the best use of their available limited resources.

Another focus of this facility requirements analysis is related to the various federal and state standards to which airports must comply. Many of these standards were developed to address safety and security issues so that aircraft can operate at the highest level of safety. Thus, as a part of this analysis, a review of existing facilities was completed to determine areas in which compliance shortfalls exist. Additionally, changes in any standard related to the projected change in aircraft fleet mix or other planned improvements were identified so that future development does not preclude another improvement at a later date. For example, the placement of aircraft storage hangars should consider not only the existing, but also the future, runway approach minimums to avoid penetration into the planned approach surfaces. Facility shortfalls were identified using a variety of sources, with the main source being the current version of Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13, *Airport Design*. Furthermore, additional improvements were identified upon the physical inspection of facilities during the inventory phase of this project. The existing facilities were compared with these standards, and facilities not in compliance are subsequently identified and discussed.

Furthermore, changes in aviation activity can create additional facility needs. As discussed in the Aviation Forecasts section of this report, HEG is expected to experience growth in both the number of based aircraft and the annual level of aircraft operations, as well as changes in the proportion of ultralight aircraft relative to other, larger aircraft. Over the 20-year planning period, the airport is projected to see an approximate 31 percent increase in based aircraft and almost 25 percent growth in operations. Discussion of the pertinent improvements related to these issues occurs throughout this chapter.

Yet, another factor in developing these facility requirements is the consideration of the ultimate development of HEG even looking past the 20-year planning period. This was needed to preserve areas for future airport development and to encourage local authorities to consider the ultimate development expected at HEG when making decisions regarding local land use. This is critical since land use around an airport does not remain stagnant and many airports, including HEG, are faced with a limited expansion capability due to encroaching residential developments. In some cases, this has been avoided by properly protecting future airport development needs through the planning process, which is one goal of this study.

The following discussion provides a systematic review of current and future conditions at HEG, upon which a development program was shaped. Where appropriate, future requirements were identified at five-year intervals (milestone years). The information provided by this facility requirements analysis was incorporated into the formulation of future airport development alternatives, which is the focus of the next chapter. Thus, detailed solutions to the identified shortfalls are not the focus of this present discussion; however, when appropriate, this discussion does highlight potential ways in which the need can be met.

Airport Role and Service Level

HEG is included in the National Plan of Integrated Airport System (NPIAS), which is published by the U.S. Department of Transportation. In the NPIAS, the FAA establishes the role of those public airports defined as essential to meet the needs of civil aviation and to support the Department of Defense and Postal Service. Each airport's role is identified as one of five basic service levels: Commercial Service-Primary, Commercial Service – Non-Primary, Reliever, Transport, and General Aviation (GA). These levels describe the type of service that the airport is expected to provide to the community during the NPIAS five-year planning period. It also represents the funding categories set up by Congress to assist in airport development. HEG is categorized as a General Aviation (GA) Reliever Airport, based on data collected and transmitted to Congress by the Secretary of Transportation for the 2007-2011 planning period, the most recent edition of the NPIAS.

In addition to its role as a GA reliever airport within the Jacksonville metropolitan statistical area (MSA), HEG is also identified within the Jacksonville Aviation System as a GA recreational and sport flying airport. Based upon discussions with Jacksonville Aviation Authority (JAA), it is anticipated that its role within the JAA system will continue throughout the 20-year planning period. The assertion that HEG will continue to attract this kind of activity determined the facility needs for the airport during the short and long-term planning horizons. As previously established in the capacity analysis section of this chapter, the airport's specific requirements focus primarily on the development of GA facilities to accommodate anticipated demand at HEG.

AIRFIELD FACILITIES REQUIREMENTS

Runway Requirements

As the primary airfield component, the available runway(s) should meet the necessary criteria for those aircraft operating at the airport throughout the planning period. Based upon AC 150/5300-13, *Airport Design*, and AC 150/5325-4A, *Runway Length Requirements for Airport Design*, runway length and separation requirements were evaluated based upon projected operations and critical aircraft. Prior to discussing the outcome of the runway requirements analysis, it is important to define several safety-related standards. The goal of the following defined areas is to provide the safest operating environment for aircraft operators and the surrounding community:

- **Runway Safety Area (RSA)** - A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The RSA needs to be: (1) cleared and graded with no potentially hazardous ruts, humps, depressions, or other surface variations; (2) drained by grading or storm sewers to prevent water accumulation; and (3) capable, under dry conditions of supporting the occasional passage of aircraft without causing structural damage to the aircraft. Finally, the RSA must be free of objects, except for those that need to be located in the safety area because of their function.

- **Runway Object Free Area (ROFA)** - The ROFA is centered on the runway centerline. Standards for the ROFA require clearing the area of all ground objects protruding above the RSA edge elevation. Except where precluded by other clearing standards, it is acceptable to place objects that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the ROFA. Objects non-essential for air navigation or aircraft ground maneuvering purposes are not to be placed in the ROFA. This includes parked airplanes and agricultural operations.

- **Runway Protection Zone (RPZ)** - A RPZ, or clear zone as it was formerly named, is a two-dimensional trapezoidal shaped area beginning 200 feet from the usable pavement end of a runway. The primary function of this area is to preserve and enhance the protection of people and property on the ground. The size or dimension of the runway protection zone is dictated by guidelines set forth in **FAA AC 150/5300-13, Change 10**, *Airport Design*. Airports are required to maintain control of each runway's RPZ. Such control includes keeping the area clear of incompatible objects and activities. This control is much easier to achieve and maintain through the acquisition of sufficient property interests in the RPZs.

In the past, the FAA would allow airports to have modifications to these standards. However, due to recent incidents, airports must adhere to these safety clearance and grading standards in order to obtain funding. In fact, several years ago, the FAA undertook a national program to bring all RSAs into compliance with the published standards. At HEG, the dimensions of these runway safety areas are quite different from those that would be required for an airfield that accommodates larger aircraft operations. The land that surrounds the extended runway centerlines adequately provides for sufficient areas of clearance should an aircraft be involved in a runway undershoot, overshoot, or excursion.

Configuration

As previously mentioned in **Chapter 2**, *Existing Conditions,* the two runways at HEG are oriented in an offset "open-v" configuration. As a result, the runway protection zone on the arrival end of Runway 11 extends over and above Runway 7-25, a portion of Taxiway A, and out into an open field adjacent to the FBO apron. Although the runways do not cross, this overlapping arrangement of the RPZ inhibits runway operational independency.

A review of the wind coverage percentages at HEG, previously presented in **Table 2-2**, show that Runway 7-25 alone meets the required 95 percent coverage for crosswinds of 10.5, 13, 16, and 20 knots, for any weather condition. This assessment applies for all-weather, visual, and instrument conditions. As such, if Runway 7-25, which is considered the primary runway, were the only option available at HEG, aircraft falling within an ARC classification of A-I through B-II could safely operate 100 percent of the time. These aircraft types constitute the majority of the based aircraft fleet and operate routinely at the airport.

However, although the data dictates that the primary runway is sufficient to provide coverage during all weather conditions, the functional use of 11-29 will be evaluated in the future development of the airfield. For this analysis, based upon forecast increases in operational activity, consideration was given to the use of Runway 11-29 throughout the planning horizon of this study.

As previously assessed in **Chapter 2**, *Existing Conditions,* the wind coverage crosswind component compared to aircraft crosswind capability is a key component of runway development. For HEG, wind coverage for the 10.5-knot and 13-knot crosswind component is summarized in **Table 4-11** by weather condition.

TABLE 4-11
WIND COVERAGE PERCENTAGES

Airfield Configuration	Crosswind Component			
	10.5-knots (12 mph)	13-knots (15 mph)	16-knots (18 mph)	20-knots (23 mph)
All-Weather Conditions				
Runway 7-25	96.99%	98.67%	99.77%	99.91%
Runway 11-29	95.71%	97.84%	99.59%	99.91%
All Runways	98.73%	99.59%	99.93%	99.99%
VFR Conditions (Ceiling > 1000'; Visibility > 3.0 statute mile)				
Runway 7-25	97.08%	98.70%	99.78%	99.97%
Runway 11-29	95.92%	97.99%	99.61%	99.92%
All Runways	98.87%	99.64%	99.94%	99.99%
IFR Conditions (Ceiling between 250' and 1000'; Visibility between 0.75 and 3.0 statute mile)				
Runway 7-25	96.25%	98.35%	99.68%	99.95%
Runway 11-29	93.97%	96.55%	99.42%	99.89%
All Runways	97.41%	99.11%	99.85%	99.99%

Source: National Climatic Data Center, 1989-1998, Cecil Field, and The LPA Group Incorporated, 2005

Runway Pavement Condition

As stated in **Chapter 2**, Herlong Airport was constructed by the U.S. Navy and U.S. Army Air Corps in 1940 as a pilot training facility for World War II pilots. Based upon physical observations and the Pavement Rating Matrix, **Figure 4-4**, both Runways 7-25 and 11-29 are in fair condition since both runways will require minor patching and/or surface overlay within the next five years. Limited historical pavement data was available, but according to available documentation provided by JAA:

- 1997- Runways 7-25 and 11-29 were resealed;
- 1997 - Approximately 2000 feet of runway pavement on Runway 7-25 was milled and overlaid;
- 1983 - Runway 11-29 was overlaid and remarked;
- 1980-81- Runway 7-25 was overlaid and remarked; and
- 1980-81 - Two stabilized 100 x 500 foot overruns were constructed.

Further, there is no record of any improvements to the closed runways which show severe and widespread cracking and pavement distortion. Therefore, according to the FDOT Pavement Rating Matrix, this pavement has failed and will require reconstruction. Since limited pavement construction and rehabilitation data is available, it is recommended that JAA authorize a pavement condition report and create a pavement status database in order to determine when pavement rehabilitation and overlays may be required at HEG.

Turf Runway

As shown in **Table 4-11**, 74 percent of airport operations, including powered and non-powered aircraft, use Runway 7-25. At the time of this writing, non-powered aircraft either use Runway 7-25 or the parallel grassy area between Taxiway A and Runway 7-25. Based upon observations and data obtained from airport management, average non-powered aircraft operations at HEG which use Runway 7-25 represent approximately 25 percent of local operations or 8,700 operations per year. Therefore, it is recommended in order to de-conflict powered and non-powered operations on Runway 7-25 as well as eliminate the use of the grassy area located between Runway 7-25 and Taxiway A that a turf runway be developed.

The anticipated increase in the number of based aircraft at HEG categorized as ultralight or otherwise dictates that the current runway operating environment may not accommodate these flight activities throughout the twenty year planning period. Further, structurally and instrumentally, ultralight and experimental aircraft do not require precision approach or otherwise instrumentally-equipped runways to operate. Moreover, a large amount of these aircraft operate only during VFR weather and most are not outfitted with the advanced instrumentation needed for operation on a paved runway environment during inclement weather. Slower moving and less heavy, these aircraft typically prefer the use of a grass strip as it minimizes aircraft tire abrasion during touchdown. Aircraft operational safety is the main purpose for recommending a turf runway, thus imparting a clear separation of aircraft activity on the airfield to achieve this goal.

A turf runway that provides exclusive access to gliders, ultra lights, and small experimental aircraft could alleviate ultralight activity from both Runways 7-25 and 11-29. This proposal seeks to isolate these aircraft since they are not required to provide radio confirmation of their position and are typically slower moving compared to traditional aircraft. Further, the separation of aircraft is likely to increase capacity on Runway 7-25.

The construction of a Turf runway requires the same elements as a traditional paved runway surface including grading, orientation, dimensional and separation requirements, and safety guidance criteria. Turf runway lengths and configurations are discussed in more detail in **Chapter 6**, *Airport Alternatives*.

It is important to segregate this type of aircraft activity at HEG since non-powered or ultralight aircraft are not required to comply with the same aircraft instrumentation and/or flight operational requirements as most powered aircraft due to their weight classification and absence of FAA certification. Discriminating between aircraft type and operational capability will ensure that safety, both on the ground and in the air, can be maximized by isolating those aircraft that may interfere with the regulated/procedural nature of heavier, certificated aircraft.

Taxiway Requirements

A number of taxiways exist at HEG as identified during the inventory phase of this study. These taxiways serve as routes for aircraft to maneuver to and from various portions of the airfield. FAA taxiway design standards are determined by the aircraft wingspan and wheel configurations for the critical aircraft routinely using the taxiway. These standards allow an appropriate safety margin beyond the maximum wingspan for the Airplane Design Group. Each of the following sections discusses the major taxiways and their related connector taxiways available for use at HEG. It should be noted that other taxiway improvements are identified in the alternatives analysis to provide appropriate access to proposed development areas.

As previously discussed in **Chapter 2**, *Existing Conditions*, the taxiway system connecting the apron and the runways at HEG are sufficient in their capacity to minimize delay and maximize access. However, a main initiative of this chapter is to recommend the development of the southern portion of the airfield and integrate the two closed runways into the taxiway system. Regarding future development within the vicinity of these pavement areas, it is suggested that the benefit of existing structures be utilized to expand the functional areas of the airport and to make use of the land available within HEG's property boundary. In doing so, the inactive runway pavement can provide sufficient space and access to the development of a southern apron and turf runway for glider, ultralight, and experimental aircraft as well as potential corporate development.

Taxiway A

Taxiway A is the parallel taxiway located to the north side of Runway 7-25. Taxiway A was constructed to provide access to the north design apron and Runway 7-25, and, therefore, should be designed and

constructed to meet the existing and future critical aircraft requirements. Taxiway A complies and in some cases exceeds the FAA published design criteria for a B-II aircraft. Suggested modifications include surface rehabilitation and maintenance repair to protect from surface deterioration. As the primary taxiway for Runway 7-25, projects associated with Taxiway A, including pavement sealing and resurfacing, are eligible for federal funding.

Taxiway B

Taxiway B is a stub taxiway connecting Runway 7-25 with parallel Taxiway A. Other than the Taxiway A stub taxiways located at the thresholds of Runways 7 and 25, Taxiway B provides the only other exit taxiway from Runway 7-25 to the FBO transient apron. Taxiway B extends past Runway 7-25 to provide access to Runway 11-29 and Taxiway D, and it complies with all dimensional standards serving B-II aircraft. Suggested modifications for Taxiway B include surface rehabilitation and maintenance repair to protect from further surface deterioration.

Taxiway C

Taxiway C is a connector taxiway that directly connects Runways 7-25 and 11-29. Taxiway C has a width of 50 feet, exceeding the minimum requirement to support the safe movement of B-II aircraft. Taxiway C complies with dimensional standards stipulated by FAA AC 150/5300-13, *Airport Design,* and serves as a point of egress from Runway 11-29.

It should be noted that Taxiway C does not connect to the north GA apron area. Therefore, aircraft landing on Runway 29 and exiting via Taxiway C will have to clear Runway 7-25 traffic to access either the terminal apron or FBO Apron via Taxiways A-1 or B. However, this requires aircraft to taxi along Runway 7-25. As a result, it is recommended that the portion of Taxiway C which connects Runway 7-25 to Runway 11-29 be closed.

Taxiway D

Taxiway D is a parallel taxiway to Runway 11-29 and connects Taxiway B, Taxiway C, and serves as an access point to the closed runway pavement to the south of the airfield. The width of Taxiway D is 40 feet, which provides sufficient wing-tip clearance to the type of aircraft using HEG. Runway centerline to taxiway centerline separation is 526 feet, which exceeds the minimum requirement for taxiway separation clearance for airports serving B-II aircraft. Suggested modifications for Taxiway D include surface rehabilitation and maintenance repair to protect from further surface deterioration.

Taxiway E

Taxiway E provides access from Runway 7-25 to the southwest closed runway. In order to provide access to general aviation development to the northwest of the airfield, JAA intended to rehabilitate the existing pavement and extend Taxiway E to connect with the existing Taxiway A. The existing width and the proposed extension of Taxiway E is 40 feet, which will serve B-II aircraft.

At the time of this writing, the extension of Taxiway E was delayed as a result of issues relating to ultra light and glider aircraft. Since the majority of non-powered aircraft land in the grassy area between Runway 7-25 and Taxiway A, the extension of Taxiway E with or without lighting would impact their operations. It is recommended that a Turf Runway be constructed to alleviate this issue and allow for the extension of Taxiway E to coincide with North GA development.

Future Taxiways

As noted previously, the inactive runways to the south of the operational runways provide access to the south portion of the airfield. The width of these pavement areas is approximately 150 feet. It is suggested that these pavement areas be resurfaced to a width of 35 feet to accommodate existing and anticipated development on the south side of the airfield. Small hangars already exist adjacent to one closed runway, thereby supporting the reuse of the closed runways as taxiways. In addition, paved taxi areas should be equipped with MITLs to provide better visual guidance to pilots at night and during poor visibility conditions.

Taxiway Pavement Condition

The condition of the taxiway pavement at HEG varies from taxiway to taxiway. A forthcoming study by the Florida Department of Transportation (FDOT) will evaluate airfield pavements and conditions for all airports within the State of Florida. This effort details the magnitude of deterioration or wear of the pavement at HEG as well as other airports around the state. Until that report is published, the condition of the airport's pavement structures was identified via visual inspection as denoted in Chapter 2, *Existing Conditions, and based upon historical pavement data provided by JAA*. Most taxiway structures at HEG are in fair to good condition. According to **FAA AC 150/5320-17**, a method of pavement rating and surface condition is established that characterizes the surface rating scales into numerical form, with a rating of 5 as "excellent" and a rating of 1 as "failed". This scale is shown in **Figure 4-5**. As previously cited, most taxiway pavement at HEG is either noted with a rating of 3 or 4, which correspond to "good" and "fair", respectively.

FIGURE 4-5
PAVEMENT RATING MATRIX

Surface rating	*Visible distress**	*General condition/ treatment measures*
5 Excellent	None, or initial thermal cracks, all narrow (less than 1/8")	New pavement less than 5 years old. No maintenance or isolated crack sealing required.
4 Good	Additional thermal cracking. Cracks generally spaced more than 50' apart. Less than 10% of cracks and joints need sealing. Minimal or slight raveling. No distortion. Patches in good condition.	Recent sealcoat or pavement over 5 years old. Seal open cracks or joints and replace sealant where needed.
3 Fair	Moderate raveling. Thermal cracks and joints generally spaced less than 50' apart. Crack sealing or repair of sealant needed on 10%-25% of cracks or joints. Edge cracks along 10% or less of pavement edges. Block crack pattern with cracks 6'-10' apart. Isolated alligator cracking and poor patches. Minor distortion or crack settlement less than 1".	Seal open cracks and joints. Replace failed sealant. Apply new surface treatment or thin overlay. Minor patching and joint repair.
2 Poor	Frequent thermal cracks. Wide cracks and joints with raveling in cracks. Deterioration along more than 25% of cracks. Edge cracks on up to 25% of pavement edges. Block cracks spaced 5' apart or less. Alligator cracking or poor patches cover up to 20% of surface area. Distortion or settlement 1"-2".	Needs significant crack sealing plus patching and repair on up to 25% of pavement surface. Overlay entire area with structural overlay.
1 Failed	Widespread, severe cracking with raveling and deterioration. Alligator cracking and potholes over 20% of the area. Distortion over 2".	Condition may be limiting service. Needs reconstruction.

Source: Pavement Surface Evaluation and Rating (PASER) Manual, FAA AC 150/5320-17, Airfield Pavement Surface Evaluation and Rating Manuals, 2005.

According to historical data, maintenance and pavement improvements from 1980 through 1997 include the following:

- 1980-81 - 40 x 4,262 foot overlay of Taxiway A
- 1983 - Overlay of Taxiway D and portion of Taxiway C
- 1996 - North Apron T-Hangar Taxi lane Construction
- 1997 - Overlay of Taxiways A, B and D, and
- 1999 - Construction of runway holding pads on Taxiways A, B and C

Taxiway pavements at HEG have signs of visible distress, and the closed runways need significant maintenance and re-surfacing. Raveling, a progressive loss of pavement material from the surface downward caused by stripping of the bituminous film from the aggregate, and thermal cracking, caused by fluctuations in temperature and the hardening of aging asphalt, are the main types of surface deterioration. It is recommended that taxiway pavement designated as "fair" be sealed to replace failed sealant or resurfaced to repair open cracks and joints. Pavement condition identified as "good" generally requires minor sealing maintenance to repair.

As a general guideline, taxiway pavement should be resurfaced every ten years, depending on relative condition and degree to which the pavement inhibits the safe and expeditious movement of aircraft

across the airfield. Most pavement structure failings are likely caused by the variation in temperature during the seasons, as well as poor design and drainage issues caused by rain.

Airfield Lighting

Both runways at the Airport have Medium Intensity Runway Lights (MIRLs) and threshold lighting. Taxiway A is equipped with Medium Intensity Taxiway Lights (MITLs) which were installed in 1980, whereas Taxiways B, C, and D are not illuminated. Taxiway B, a stub taxiway, and Taxiway C, a connector taxiway, do not require this type of illumination system; however, since a dual runway environment is considered in the evaluation of the airfield, it is suggested that Taxiway D—a full-length parallel taxiway adjacent to Runway 11-29—should include a MITL system to provide better guidance for pilots and offer increased visibility during night conditions. Although Runway 11-29 is considered a crosswind runway, Runway 7-25 provides over 95 percent wind coverage. Therefore, FAA will not participate on any work associated with Runway 11-29.

A recurring problem for HEG is the effect of thunderstorm activity, particularly lightning, that has repeatedly short-circuited the airfield's PAPI equipment. The PAPI system was installed within the last 3 to 5 years to replace the older VASI system. At the time of this writing, JAA Engineering and the lighting manufacturer have been trying to resolve this problem. It appears that the system becomes overloaded during thunderstorms. As of yet, this problem has not been resolved. Since airfield lighting is critical to the use of a runway especially during low visibility conditions, a prompt resolution of this issue is recommended and expected in the short-term.

Proposed T-hangar development as outlined in the last master plan update is hampered by the current location of the electrical vault. The vault is located within the taxi lane safety area associated with the new T-hangar development. Therefore, the vault will need to be relocated to another location on the airfield. JAA is assessing alternatives to address this issue, and potential location and anticipated costs associated with the potential electrical vault relocation were evaluated in **Chapter 5**, *Alternatives Analysis*, and **Chapter 7***, Implementation Plan*.

Another foremost issue regarding airfield lighting is the ability to provide power to the southern portion of the airfield. This master plan update proposes that the closed runways south of the existing runway structures be transformed into taxiways and equipped with the appropriate lighting to facilitate the safe movement of aircraft to this portion of the airfield. Problematic is the unresolved issue of connecting lines of power via underground conduits from the remote electrical vault located adjacent to the apron north of Runway 7-25.

Airfield Signage

The Airport is equipped with runway and taxiway signage; the purpose of which is to provide directional guidance to pilots on the airfield. Required airfield signage based upon AC 150/5340-18D includes:

- Holding Position Signs
- Taxiway Location Signs
- Exit signs for both runway directions and at each runway threshold
- Direction Signs
- Location Signs, and
- Outbound destination signs on either end of the Runway.

The airport is equipped with some signage, including three (3) taxiway guidance signs that were installed adjacent to Runway 7-25 in 1981, but requires additional taxiway signage, direction signs, and outbound destinations signs on both Runways 7-25 and 11-29. However, due to lightning and aircraft strikes in addition to general deterioration, existing signage is limited. Therefore, based upon the requirements outlined in AC 150/5340 and anticipated demand, a new signage plan, including additional signage and improvements to existing airfield signage is recommended in conjunction with any runway or taxiway improvements.

In addition to location and directional signage, distance remaining signage should be considered for installation to the designated primary runway, 7-25. While this may not be a long runway, it would provide pilots with a better awareness of the remaining runway length available. Also, throughout the planning period, existing signage should be maintained in proper working order. Additionally, as other airfield pavement projects are conducted, new signage should be installed and existing signage should be upgraded to meet FAA design criteria. The types and number of new signs that are likely to be required during the planning period depend upon the selected development alternatives.

It is important to note, however, that federal funding will likely be available for the airfield signage plan and signage improvement related to Runway 7-25. However, it is anticipated that federal participation on projects related to Runway 11-29 will not occur.

Pavement Markings

Runway pavements are marked with painted lines and numbers in order to aid in the identification of the runways from the air and to provide information to the pilot during approach phase of flight. There are three standard sets of makings used depending on the type of runway:

- Basic – For runways with only visual or circle to land procedures. These markings consist of runway designation markers and a centerline stripe.
- Non-precision – For runways to which a straight-in, non-precision instrument approach has been approved. These markings consist of runway designation markers, a centerline stripe, and threshold markings.

- Precision – For runways with a precision instrument approach. These markings consist of the non-precision markings plus aiming point markings, touchdown zone strips, and side stripes indicating the extent of the full strength pavement.

Depending on the type of aircraft activity and physical characteristics of pavement, additional markings may be required for any of the three categories above. The FAA also allows markings on a runway to be upgraded at any time to include elements that are not required, but may enhance safety. Runway pavement markings are painted white and taxiway pavement is painted yellow. The FAA provides guidance for pavement marking in **AC 150/5340-1J**.

Only the 25 end of Runway 7-25 is marked as a non-precision runway. An inspection of Runway 7-25 revealed that the runway markings are in good condition. However, periodic re-marking should be considered to enhance the safety of aircraft movement during low visibility conditions. Runway 11-29 is marked as a visual runway with basic markings. An inspection revealed that the Runway 11-29 marking is in good condition, but future re-marking should be incorporated into the planning horizon.

The inactive runway pavement is in critical need of resurfacing and re-marking to bring the pavements up to standards and to remark the centerline and edge of pavement as outlined in **AC 150/5300-13**. Periodic re-marking of all airfield markings should be conducted. Pavement markings are critical to provide visual guidance to aprons, runways, and other areas of the airport. Deterioration of these markings can cause conflicts during inclement weather and can create general confusion to pilots who navigate on the ground. Even more critical are the taxiway and runway hold bar markings that tell pilots where to stop to avoid runway incursions or to remain clear of NAVAID critical areas. While not required for an airport the size of HEG, runway hold bar markings are highly recommended especially in conjunction with the possible installation of a precision approach.

Weather Instruments

Weather instruments provide invaluable meteorological data for pilots operating at the airport. There are two weather instruments at HEG: a windsock and an AWOS.

Windsock

A windsock or wind cone visually provides surface wind direction to pilots and must be visible from all runway ends. Further, wind direction indicators must be lighted, and should include a segmented circle to denote the traffic pattern to each runway since the airport is not equipped with an ATCT.

At HEG, the wind cone and segmented circle, which were re-cabled, wired and lighted in 1980, are located in the midfield, and is visible from all runway thresholds. However, if an extension of either Runway 7-25 or 11-29 is warranted, then relocation of the wind cone and segmented circle will be required.

Automated Weather Observation System (AWOS)

Automated Weather Observation System (AWOS) is a suite of sensors, which measures, collects and broadcasts weather data to help meteorologists, pilots and flight dispatchers prepare and monitor weather forecasts, plan flight routes, and provide necessary information for correct takeoffs and landings. The AWOS at HEG, which was installed in 1981, automatically broadcasts weather information using 119.275 MHZ. AWOS units provide a minute-to-minute updates to pilots by VHF radio or non-directional beacon. Each hour, data is available to off-site users by means of long-line telephone communication or satellite uplink, which include precipitation, visibility, barometric pressure, wind speed and direction and temperature. No changes are currently recommended for this equipment.

Automated Surface Observing System (ASOS)

In addition to the AWOS currently located at HEG, Pilots may use ASOS systems currently located at Cecil Field (VQQ), Jacksonville International (JAX) and Craig Municipal (CRG) airports. The ASOS System is sponsored by the FAA, Department of Defense (DOD) and National Weather Service (NWS). An ASOS provides weather observations including: temperature, dew point, wind, altimeter setting, visibility, sky condition, and precipitation, and provide pilot and other users critical weather data. The ASOS routinely provides computer generated voice data directly to aircraft within the vicinity of the airport. The overall purpose of the ASOS system is to improve the safety and efficiency of aviation operations.

GENERAL AVIATION REQUIREMENTS

The majority of activity at HEG now and throughout the planning period is comprised of general aviation (GA) operations. As such, a variety of facilities should be planned to meet the projected GA demand as outlined in the Aviation Forecasts. This section addresses the needs of both based and transient users related to aircraft storage, fuel facilities, terminal space, and automobile parking demand.

Hangar Demand

Based aircraft are routinely stored at airports in a variety of hangar types. The type of hangar used is determined by aircraft size and type as well as by existing availability. Currently, the following types of hangars are in general use at HEG:

- *T-hangar units* – a full-enclosed building having individual stalls, each capable of storing one aircraft, typically a single-engine or a light multi-engine aircraft. Variations of this hangar type include dome hangars.

- *Clear span hangars* - a fully enclosed building typically capable of holding multiple aircraft (five to seven each); these are often referred to as storage hangars.

- *Conventional hangars* - similar to clearspan hangars, but typically have an attached office. These hangars are assumed to hold one to three business jet or turboprop aircraft each.

A review of the current hangars available at HEG revealed that there are: 72 T-hangars, two bulk storage facilities, and one 26,493 SF maintenance facility. T-hangar facilities are located in two distinct portions of the airfield. Approximately 48 T-hangar units are co-located within three buildings just north of the east apron. An additional 24 units are contained within two structures that are positioned west of the west apron. At the time of this writing, 14 additional T-hangars are being constructed west of the 24 units discussed above. **Table 4-12,** *Based Aircraft Demand***,** outlines the based aircraft fleet mix for HEG through the year 2025.

TABLE 4-12
BASED AIRCRAFT DEMAND

Year	Single-Engine	Multi-Engine	Turbine/Jet	Rotor	VLJ	Other*	Total
Base year							
2005	128	15	5	4	0	18	170
Forecast							
2010	130	15	6	4	0	24	179
2015	131	15	7	4	1	33	190
2020	133	15	9	5	2	43	205
2025	134	14	11	5	4	60	224

**Note: "Other" includes light sport aircraft, ultra lights, blimps, gliders, etc.*
Source: THE LPA GROUP INCORPORATED, 2006

Based upon existing demand for hangar space within the Jacksonville Aviation System, it is anticipated that by the year 2025 75 percent of based piston aircraft and 100 percent of turboprop, turbojet and rotorcraft will reside in aircraft storage facilities. Currently gliders, tail draggers, ultra lights and other non-powered aircraft are not stored in any existing hangar facilities. However, based upon discussions with the North Florida Glider Club as well as interest from several blimp operators, it is anticipated that at least 50 percent of "Other" aircraft will require some sort of aircraft shelter or storage facility on the airport.

Hangar and apron facility requirements were determined based upon the number and size of aircraft based at the airport. Representative general aviation aircraft used in this analysis were:

- Piston engine aircraft (Design Group I) – Beech Baron (Wingspan = 38 feet, Length = 30 Feet)
- Turboprop and Jet Aircraft (Design Group II) – Grumman Gulfstream I (Wingspan = 78.3 feet, Length = 75.3 feet)

The methodology used to determine hangar space requirements is based upon the following assumptions:

- Each T-Hangar Unit accommodates one aircraft
- Each Conventional Hangar Unit accommodates three (3) aircraft
- Each Corporate Hangar Unit accommodates two (2) aircraft
- Approximately 70 percent of Single-Engine Aircraft are in T-Hangars
- Approximately 40 percent of Multi-Engine Aircraft are housed in T-Hangars
- 100 percent of based turbine, jet and rotorcraft are housed in conventional and corporate hangar facilities,
- 100 percent of VLJs will be housed in aircraft storage facilities with approximately 50% housed in corporate or conventional hangars and the remaining 50 percent housed in T-Hangars, and
- Approximately 50 percent of "Other" category aircraft, such as gliders, tail draggers, experimental aircraft and blimps will be housed in aircraft storage facilities. Based upon this assumption, blimps will be housed in a conventional hangar facility, experimental aircraft in T-Hangars, and gliders in shade hangars or other similar facilities.

TABLE 4-13
FORECAST PERCENT OF BASED AIRCRAFT DEMAND

	Hangars					
Aircraft Type	**Conventional**	**Corporate**	**T-Hangar**	**Shade Hangars**	**Apron**	**Total**
Jet	50%	50%	0%	0%	0%	100%
Multi-Engine	10%	50%	40%	0%	0%	100%
Single Engine	0%	0%	70%	0%	30%	100%
Helicopter	70%	20%	0%	0%	10%	100%
Very Light Jets	25%	25%	50%	0%	0%	100%
Other	4%	0%	21%	25%	50%	100%

Source: The LPA Group Incorporated, 2006

Applying the storage requirements for based aircraft to the forecast of based aircraft resulted in the following demand as shown in **Table 4-14**, *Hangar Storage Demand*, over the twenty-year planning period.

TABLE 4-14
HANGAR STORAGE DEMAND (2005-2025)

Aircraft Type	Hangar Storage Demand					
	Conventional	Corporate	T-Hangar*	Shade Hangars or Other Facilities	Apron	Total
Year 2005						
Jet	3	2	0	0	0	5
Multi-Engine	1	8	6	0	0	15
Single Engine	0	0	90	0	38	128
Helicopter	3	1	0	0	0	4
Very Light Jets	0	0	0	0	0	0
Other	0	0	3	5	10	18
TOTAL 2005	**7**	**11**	**99**	**5**	**48**	**170**
Year 2010						
Jet	3	3	0	0	0	6
Multi-Engine	2	7	6	0	0	15
Single Engine	0	0	91	0	39	130
Helicopter	3	1	0	0	0	4
Very Light Jets	0	0	0	0	0	0
Other	1	0	5	6	12	24
TOTAL 2010	**9**	**11**	**102**	**6**	**51**	**179**
Year 2015						
Jet	3	3	0	0	0	6
Multi-Engine	1	8	6	0	0	15
Single Engine	0	0	92	0	39	131
Helicopter	3	1	0	0	0	4
Very Light Jets	0	1	0	0	0	1
Other	1	0	7	8	17	33
TOTAL 2015	**8**	**13**	**105**	**8**	**56**	**190**

Source: The LPA Group Incorporated, 2006

TABLE 4-14 (CON'T)
HANGAR STORAGE DEMAND (2005-2025)

Aircraft Type	Hangar Storage Demand					
	Conventional	Corporate	T-Hangar*	Shade Hangars or Other Facilities	Apron	Total
Year 2020						
Jet	4	3	0	0	0	7
Multi-Engine	1	8	6	0	0	15
Single Engine	0	0	93	0	40	133
Helicopter	2	1	0	0	1	4
Very Light Jets	1	1	0	0	0	2
Other	2	0	9	11	22	44
TOTAL 2020	**10**	**13**	**108**	**11**	**63**	**205**
Year 2025						
Jet	4	3	0	0	0	7
Multi-Engine	1	7	6	0	0	14
Single Engine	0	0	94	0	40	134
Helicopter	4	1	0	0	0	5
Very Light Jets	1	1	2	0	0	4
Other	2	0	13	15	30	60
TOTAL 2025	**12**	**12**	**115**	**15**	**70**	**224**

**Note: Herlong Airport currently has a T-Hangar Waiting List of 40 aircraft*
Source: The LPA Group Incorporated, 2006

Given anticipated growth in the micro or very light jet market, the need for additional hangar space is significant since demand trends indicate that hangar space is optimum for these types of aircraft.

Based upon anticipated based aircraft and associated fleet mix over the twenty-year planning period, additional hangar space, whether T-hangars, conventional, corporate or shade hangars, is required. Current aircraft storage limitations require interested parties to place their name on a waiting list until such time as either new facilities are constructed or vacated by an existing tenant. At the time of this writing, 40 people were on the HEG aircraft storage waiting list. Consequently lack of hangar facilities will inevitably lead to a stagnation of based aircraft growth.

Table 4-15, *Hangar Storage Requirements*, highlights the required hangar space based upon forecast demand as determined by the method outlined previously and delineates the specific needs of T-hangar and conventional hangar space requirements to accommodate anticipated growth in hangar demand.

TABLE 4-15
HANGAR DEMAND (2005-2025)

	2005	2010	2015	2020	2025
Existing Conventional Hangars	2	2	2	2	2
Conventional Hangar Demand	2	3	3	4	4
(Shortage)/Surplus	**0**	**(1)**	**(1)**	**(2)**	**(2)**
Existing Corporate Hangars	0	0	0	0	0
Corporate Hangar Demand	6	6	6	6	6
(Shortage)/Surplus	**(6)**	**(6)**	**(6)**	**(6)**	**(6)**
Existing T-Hangars	72	100*	100*	100*	100*
T-Hangar Demand*	99	102	105	108	114
(Shortage)/Surplus	**(27)**	**(2)**	**(5)**	**(8)**	**(14)**
Existing Shade Hangars	0	0	0	0	0
Shade Hangar Demand	5	6	8	11	15
(Shortage)/Surplus	**(5)**	**(6)**	**(8)**	**(11)**	**(15)**

*Note: *Refers to the addition of T-Hangar facilities planned and under construction*
Source: The LPA Group Incorporated, 2006

Currently, 48 T-hangars located adjacent to the east apron and 24 T-hangars situated next to the west apron supply the needs of the single and multi-engine aircraft based on the airfield. However, at the time of this writing, JAA has finished constructing one of two 14-unit T-hangar facilities perpendicular to the to the west apron area. Construction of the other 14-unit T-hangar is planned for the near future. In the short-term, demand for T-hangar facilities are likely to continue since the Airport has an existing waiting list for aircraft storage facilities. However, in the mid- to long-term period, demand for aircraft storage, including conventional, corporate, T-hangar and shade hangar facilities, is anticipated to be based upon demand by new small aircraft, such as the Eclipse 3000, TBM 850, Cessna Mustang, etc. as well as the growth in the light sport aircraft market.

It should be noted that these numbers reflect information presented by the aviation activity forecast, but do not reflect the demand defined by the number of people on the HEG waiting list for hangar space. The numbers also neglect to represent the addition of larger, more sophisticated aircraft, which typically accompany commercial and corporate activities. It should also be noted that although corporate hangars do not currently exist at HEG, corporate hangars and additional conventional hangars would likely be used to meet the storage hangar requirements. However, consideration must be given to the number and size of aircraft stored in each hangar in order to provide adequate storage facilities.

Thus, based upon current demand for facilities as well as demand based upon forecast data, it is likely that the number of T-hangars required could be significantly greater than that predicted in **Table 4-15** based upon issues of space, funding availability, and demand surges. For planning purposes, the implementation of hangar development projects should be aligned with the actualization of demand rather than a particular time period.

Larger hangar needs at HEG were also considered based upon discussions with existing tenants, the existing and future fleet mix as well as recent changes in technology. At the time of this writing, there is already demand for conventional hangar facilities from some existing tenants. In addition, airport management has been approached by several parties who wish to construct conventional or corporate hangar facilities related to their operations. Thus, based upon this information and the data provided in **Table 4-15** approximately five conventional (two (2) additional to accommodate demand and three (3) based upon user interest) and six corporate hangar facilities are recommended to accommodate anticipated demand by the year 2025.

Hangar space demand is based upon anticipated changes in fleet mix based upon national and statewide trends. However, hangar space development should be planned to accommodate future contingencies that may occur within the Jacksonville Aviation System, including the increased use of HEG as a general aviation reliever facility and/or flight training facility. HEG is unique since it accommodates a mix of operations. Therefore, aircraft storage requirements must consider existing tenants and user demand while planning to accommodate potential contingencies or changes occurring within the Jacksonville Aviation System.

Aircraft Parking Apron

HEG has three aprons, but two are used primarily for based and itinerant aircraft parking. These two aprons located east and west of the Airport Terminal building have a total square footage of approximately 29,000 primarily utilized for aircraft parking. The FBO Apron located on the west side of the entrance road was initially constructed in 1980 and consists of 4,840 SY of pavement. The East apron, which is approximately 15,000 square yards (SY), was constructed in 1990 and is marked to accommodate a total of 53 aircraft tie-down parking positions. The West apron, which is approximately 14,000 SY, is marked to accommodate a total of 39 aircraft tie-downs. The third apron that is located south of the terminal facility has a total square footage of approximately 3,100 SF. This apron is used for the temporary parking of transient aircraft and can simultaneously accommodate an estimated 10 aircraft.

Located east of the airport police officer's residence is RAA, Inc. (Building 6). This tenant maintains an exclusive 1,200 SY of apron space that is located south of its hangar facility. Similarly, the Mercair facility has a small personal use apron of 3,000 SY associated with its hangar.

Based on current conditions, it is estimated that 35 percent of non-hangared based aircraft and one half of the busy-hour itinerant aircraft will require tie-down space at any one time. By applying this formula, approximately six (6) based aircraft and 21 itinerant aircraft currently require parking space for the year 2004. Forecasts of aircraft operations and parking demand are provided in Chapter 3 and 4, respectively.

Conventional and Corporate Hangar Apron

As part of continued hangar development, it is necessary for an airport to provide sufficient corporate and conventional hangar apron space for parking and maneuvering of aircraft around a hangar facility. According to **FAA AC 150/5300-13, Change 10**, conventional hangar apron area should equal the amount of storage space located within the hangar itself. Currently, HEG hosts approximately 21,820 square feet of conventional (bulk) hangar space, 26,493 square feet of maintenance hangar space, and 29,000 square yards of apron area which accommodates both based aircraft tie-downs and neighboring hangar facilities. As hangar needs increase, so does the need for more conventional apron area. Utilizing FAA guidance, each conventional hangar required 20,000 square feet (approximately 2,222 square yards) of apron and 10,000 square feet (approximately 1,111 square yards (SY)) of apron for each corporate hangar. **Table 4-16,** *Conventional and Corporate Hangar Apron Requirements***,** outlines estimated hangar apron demand anticipated for the twenty year planning period.

TABLE 4-16
CONVENTIONAL AND CORPORATE HANGAR APRON REQUIREMENTS
(BASED UPON EXISTING AND ANTICIPATED DEMAND)

Facilities	2005	2010	2015	2020	2025
Conventional Hangar Facilities (SY)					
Existing Conventional Hangars	2	2	2	2	2
Existing Conventional Hangar Apron (SY)	29,000	29,000	29,000	29,000	29,000
Additional Conventional Hangars Required*	**3**	**4**	**4**	**5**	**5**
Total Hangar Apron Required (SY)	35,666	37,888	37,888	40,110	40,110
Corporate Hangar Facilities (SY)					
Existing Corporate Hangars	0	0	0	0	0
Existing Corporate Hangar Apron (SY)	0	0	0	0	0
Additional Corporate Hangars Required	0	3	3	5	6
Additional Corporate Hangar Apron Required (SY)	0	3,333	3,333	5,555	6,666

**Note: Based upon storage demand and interest from existing and potential tenants*

New Apron space required per conventional hangar = 2,222 SY; Corporate hangar apron demand = 1,111 SY

Source: FAA AC 150/5300-13, Change 10 and The LPA Group Incorporated, 2006

The calculations show current conventional apron areas are inadequate to meet demand throughout the course of the planning period. However, it is important to remember that these calculations only consider raw numbers. Location and condition of the apron space is not factored into this equation. Site visits to HEG revealed inadequacies in the pavement condition and access to apron from some hangar facilities. Improvements are suggested in the following chapter.

Aircraft Tie-Down Apron

Since 75 percent of based aircraft are estimated to require hangar space in 2025, tie-downs should be planned to accommodate 25 percent of all based aircraft, and one-half of the busy-hour itinerant aircraft. The existing GA aircraft tie-down apron space available at HEG is approximately 32,100 square yards of which 3,100 is designated for transient aircraft adjacent to the terminal building and the remaining 29,000 SY is located on the East and West Ramps providing parking for both based and transient aircraft. Sizing criteria for tie-down positions vary according to aircraft size, including space for circulation and fueling. **FAA AC 150/5300-13** recommends 300 SY for based aircraft tie-downs and 360 SY for itinerant aircraft tie-downs. However, in order to assure flexibility for configuring tie-down areas, all tie-downs were sized around the Design Group II (Gulfstream I) sample aircraft.

It is important to mention that HEG does not officially designate apron areas for conventional, based aircraft tie-down, or transient tie-down apron. Much of the apron included in the tie-down totals is underutilized. The majority of transient aircraft park on the GA apron adjacent to the FBO terminal facilities. Combined, the east and west aprons can accommodate parking for approximately 81 aircraft, whereas the FBO apron can accommodate 14 aircraft at any given time. Currently, there are, in total, 95 tie-downs associated with the GA apron—43 on the east apron, 38 spaces on the west apron, and 14 spaces adjacent to the FBO terminal. In its current configuration, the east and west aprons can accommodate the forecast increase in based aircraft requiring tie-down facilities until 2025, during which time expansion of based aircraft apron space may be required.

Based upon City of Jacksonville Concurrency requirements required by Florida Growth Management Laws, Normandy Boulevard at Herlong has limited vehicle traffic capacity. Based on this determination, JAA has been forced to reduce tie-down capacity every time a new T-Hangar is constructed. JAA is continuing to work with City of Jacksonville to remove this restriction to future growth. Suggestions for improving utilization of the apron facilities are provided in Chapter 6-*Airport Alternative Analysis*.

Transient Aircraft Apron Requirements

A determination of the total amount of apron area needed cannot be developed by formula or empirical relationship since local conditions often vary. However, enough tie-down locations should be available to accommodate the peak number of aircraft at any given time. Using guidelines provided in **FAA AC 150/5300-13**, the following methods were used to estimate the transient apron space required:

- Find the peak month average day itinerant operations. This figure is obtained by multiplying the forecast activity of the average day during the peak month with the corresponding local/itinerant split.
- Add 10 percent to the above value to find peak day itinerant operations.
- Find the total number of peak day transient aircraft. This is half of the peak day itinerant operations since it is assumed that each aircraft will make two operations.

- Assume that 10 percent of the total number of peak day transient aircraft will need to be accommodated at one time.
- Increase the final calculated amount by 10 percent. The FAA suggests that the value should be increased by 10 percent to accommodate expansion for at least the next two-year period.

The final value is the total calculated demand for transient aircraft parking spaces. In order to determine the amount of parking apron required, the fleet mix for the transient aircraft must first be determined. The transient aircraft fleet mix was determined using the growth rate outlined in **Chapter 4**, *Aviation Activity Forecasts*. **Table 4-17** denotes transient peak hour demand.

TABLE 4-17
TRANSIENT PEAK DEMAND

Years	Total Itinerant Operations	Peak Month	Peak Day	Total Number of Peak Day Transient Aircraft	Peak Day Demand	Peak Day Demand + 10%
Base Year						
2005	30,560	425	15	8	4	4
Forecast Years						
2010	33,336	464	17	8	4	4
2015	35,147	489	18	9	4	5
2020	37,063	516	19	9	5	6
2025	39,089	544	20	10	5	6

Source: The LPA Group Incorporated, 2005

The results for the transient aircraft space demand are shown in **Table 4-18**.

TABLE 4-18
TRANSIENT AIRCRAFT PARKING SPACE DEMAND

Year	Single-Engine	Multi-Engine	Rotor	Multi-Engine Turbine/Jets	Other*	Total Transient Parking Spaces
Base Year						
2005	3	1	0	0	0	4
Forecast						
2010	3	1	0	0	0	4
2015	3	1	0	1	0	5
2020	3	1	0	1	1	6
2025	3	0	0	1	2	6

Note: Other includes new light sport aircraft (i.e. SATS)

Source: THE LPA GROUP INCORPORATED, 2006

To determine the amount of apron space required, the amount of space is converted into square yards. The *Airport Design* AC suggests that a minimum of 360 square yards per transient aircraft be used. **Table 4-19** reflects the results of these calculations.

TABLE 4-19
PEAK HOUR TRANSIENT AIRCRAFT APRON AREA REQUIREMENTS

Year	Total Transient Parking Demand	Total Transient Aircraft Apron Area Required (SY)	Total Transient Aircraft Apron Recommended (SY)
Base Year			
2005	4	1,440	1,800
Forecast			
2010	4	1,440	1,800
2015	5	1,800	2,160
2020	6	2,160	2,520
2025	6	2,160	2,520

Source: THE LPA GROUP INCORPORATED, 2006

Following the guidelines set forth in **AC 150/5300-13**, existing airport apron space accommodates both existing and forecast Transient Aircraft apron demand. Recommended parking demand is based upon average annual transient aircraft growth. This allows the airport to react to unplanned increases in transient demand and/or changes to aircraft fleet mix over the twenty-year planning period.

Based Aircraft Apron Requirements

At many airports, a certain percentage of based aircraft is stored on the apron or a grassy area adjacent to the apron area. Since this area is generally open and unprotected, it is used primarily to store smaller aircraft, such as single-engine and a few multi-engine piston aircraft. As mentioned earlier, airports within the Jacksonville Aviation System usually accommodate 75 percent of based aircraft stored in hangar space and 25 percent on tie down space. As of 2006, approximately *54 percent* of all based aircraft at HEG are stored in hangars, whereas *46 percent* are stored on the apron or grassy area. However, it was determined that over the planning period, the percentage of aircraft stored on the apron will decrease from 46 percent to approximately 32 percent total in 2025.

Using the data calculated in **Table 4-14**, based apron parking requirements were determined. The *Airport Design* AC suggests that a minimum area of 300 square yards be used for planning purposes. This area is considered large enough for these aircraft to maneuver. **Table 4-20** shows the amount of apron area that will be needed to accommodate the remaining based aircraft.

TABLE 4-20
BASED AIRCRAFT APRON REQUIREMENTS

Year	Based Aircraft	Based Aircraft Apron Demand	Total Based Aircraft Apron Demand (SY)
Base Year			
2005	170	48	14,400
Forecast			
2010	179	51	15,300
2015	190	56	16,800
2020	206	62	18,600
2025	224	71	21,300

Source: THE LPA GROUP INCORPORATED, 2006

Table 4-20 demonstrates that the need for apron space to accommodate future levels of based aircraft decreases as the ratio of hangar space to apron space increases. Traditionally, demand for hangar space used for aircraft storage is greater than demand for tie-down space. The benefits of hangar space over non-enclosed apron tie-down space are numerous, especially with regards to light aircraft that are expected to populate the based aircraft inventory at HEG over the planning period. Ultralight and other aircraft meeting A-I design standard criteria are more susceptible to inclement weather than heavier aircraft. The summer months in Florida often see strong thunderstorm activity, coupled with occasional hail and heavy winds. Thus, potential damage to light aircraft is increased during the summer months when they are exposed to these elements. The hobby-like nature of ultralight and glider aircraft, as well, often require these aircraft owners to have space available where structural modifications or other work can be completed. Consequently, apron space demand for based aircraft, given the growth forecast among light aircraft, will be limited, whereas demand for shade, T-hangar and conventional hangar facilities will increase over the planning period at HEG.

Total Aircraft Parking Apron Requirements

Table 4-21 provides a summary of the total apron requirements for transient and based aircraft at HEG. This table also includes the amount of new apron required to accommodate anticipated demand.

TABLE 4-21
TOTAL TIE-DOWN APRON REQUIREMENTS

	2005	2010	2015	2020	2025
Existing Based Aircraft Tie-Down Apron (SY)	29,000	29,000	29,000	29,000	29,000
Forecast Based Aircraft Requiring Tie-Down	48	51	56	62	71
Based Aircraft Apron Requirements (SY)	14,400	15,300	16,800	18,600	21,300
Surplus/(Deficiency)	14,600	13,700	12,200	10,400	7,700
Existing Itinerant Tie-Down Apron (SF)	3,100	3,100	3,100	3,100	3,100
Busy Hour Itinerant Aircraft	4	4	5	6	6
Total Itinerant Tie-Down Apron Recommended (SY)	1,800	1,800	2,160	2,520	2,520
Surplus/(Deficiency)	1,300	1,300	940	580	580
Total Existing Tie-Down Apron (SY)	32,100	32,100	32,100	32,100	32,100
Total Required Tie-Down Apron (SY)	16,200	17,100	18,960	21,120	23,820
Surplus/(Deficiency)	15,900	15,000	13,140	10,980	8,280

Source: The LPA Group Incorporated, 2006

Although it appears that no additional apron space is required to accommodate based and transient aircraft parking demand, it is recommended that new apron areas dedicated to light aircraft activity as well as transient aircraft operations be developed near the north of Taxiway A, adjacent to the proposed turf runway and possibly near the closed runways due to the location, condition and access limitations of existing facilities.

AIRPORT ACCESS

Airport access is an important component of the development of an airfield. Although not directly contributing to the aviation activity at airports, surface access provides a means by which airport users

can access those facilities and services that airports provide. The future development of roads and other infrastructure related to airport access at HEG primarily concerns the need to simplify traffic patterns, relieve congestion, and provide security for the airport that limits access to certain portions of the airfield to authorized users.

The airport entrance is situated at a node where Normandy Boulevard and Herlong Road intersect. However, this intersection is awkward because the angle at which Herlong Road meets Normandy Boulevard creates problems for merging traffic. As such, the airport entrance is located adjacent to this intersection and potentially creates a hazard for drivers trying to turn into the airport via Normandy Boulevard southbound. Additionally, residential development is already in progress just north of the airport on the north side of Normandy Boulevard. The entrance to this residential subdivision, situated directly across the access road that leads into the airport, creates a junction whereby residential, airport, and through traffic converge. Currently, there is no traffic light to accommodate the flow of this traffic, and the Florida Department of Transportation (FDOT) has limited the alteration of this area. Therefore, the addition of a new traffic signal in addition to the realignment of the entrance road on airport property could alleviate congestion related to egress of traffic and automobile parking. Further analysis of access road requirements as well as possible alternatives will be provided in **Chapter 5**, *Alternatives Analysis*.

AIRPORT SUPPORT FACILITIES

Electrical Vault

The electrical vault is currently located on the northern side of the airport to the west of the west apron in an open field. According to JAA engineering documentation, the electrical vault was originally constructed and installed in 1981. This vault houses the power and control equipment for the airfield lighting, signage and navigational aids. The electrical vault is small and contains some non-compliant equipment. While some additional equipment was installed in 1999 as part of the PAPI project, the electrical vault currently cannot support the expansion of the southern portion of the airfield from its current location. Based upon the last master plan, the vault is located in a future taxiway safety area associated with T-hangar development. Thus, due to capacity limitations and location, it is recommended that a new airport electrical vault be situated midfield to provide for these components and satisfy the needs of the development plan.

Aircraft Fuel Storage

The airport fuel farm is located immediately west of the FBO terminal facility, adjacent to the main entrance. Fuel distribution is provided by JAA through the use of two fuel trucks with the following capacities: 1,500 gallon Avgas and 2,200 gallon Jet A. Two 15,000 gallon underground fuel storage tanks (one Avgas and one Jet A) are located under the north apron facilities. A self-service fuel facility was constructed in 2002 between the East Apron and FBO Transient Apron. This station provides Avgas only, and consists of a 1,500 gallon above ground storage tank located beyond the Taxiway A object free area.

As stated in **Chapter 2**, JAA operates and manages the only fixed base operator at HEG. Aviation 100LL and Jet A fuels are available and sold to based and transient aircraft operators. Sales of aviation fuel generally peak in May for Avgas and July for Jet A. Due to the number of piston operations that occur at HEG, the month of May is the most active. 2004 and 2005 fuel sales receipts were provided by airport management and are shown in **Table 4-22.**

TABLE 4-22
FUEL SALE SUMMARY

Month	Jet A		Avgas	
	2004	2005	2004	2005
	Gallons	Gallons	Gallons	Gallons
Jan	4,378	3,589	13,721	12,409
Feb	6,070	9,390	9,523	11,558
Mar	4,357	6,378	16,182	11,636
Apr	6,094	4,941	16,123	12,871
May	6,707	5,869	19,036	13,602
Jun	5,817	5,646	17,055	11,220
Jul	7,369	4,075	13,560	11,948
Aug	5,449	6,013	13,560	9,611
Sep	4,323	2,492	7,370	11,592
Oct	5,109	4,494	16,708	11,657
Nov	6,761	2,466	12,675	12,118
Dec	4,788	3,192	13,272	10,656
Total	**67,222**	**58,095**	**168,785**	**140,427**

Source: Airport Management, 2005 and 2006

Fuel consumption information was provided by JAA and was used to calculate an average ratio of fuel used to the annual number of operations. This analysis yields a ratio of 2.43 gallons per operation for Avgas operations and 7.66 gallons per operation for Jet A. Jet A operations are based upon the sum of designated transient military and 15 percent of transient GA operations. Increases in fuel capacity were determined using these historic ratios per operation. However, it is anticipated that the percentage of turbine aircraft especially with the introduction of very light jets that the percentage of Jet A demand will increase. As operations requiring Jet A fuel increase at HEG, fuel storage requirements will increase to ensure an adequate level of Jet A capacity is provided.

In addition to increases in storage capacity, the level at which fuel is required to be delivered is expected to increase. This is mainly due to the forecast increase in operations, larger fuel requirements, and anticipated development. To meet this demand, either the airport will need to increase overall capacity

or increase fuel delivery per month. **Table 4-23** illustrates the monthly fuel storage requirements at HEG.

TABLE 4-23
FUEL STORAGE REQUIREMENTS

	2005	2010	2015	2020	2025
Avgas Demand:					
Average Month Demand	11,702	11,909	12,361	12,933	13,530
Forecast Capacity (Gallons) (1)	13,500	13,700	14,300	14,900	15,600
Fuel Tank Requirement (2)	1	1	1	1	1
Fuel Truck Requirement (3)	1	1	1	1	2
Jet A Demand:					
Average Month Demand	4,841	6,526	7,573	8,387	9,269
Forecast Capacity (Gallons) (1)	5,600	7,600	8,800	9,700	10,700
Fuel Tank Requirement(2)	1	1	1	1	1
Fuel Truck Requirement (4)	1	1	1	1	1
Fuel Farm Area (SF) (5)	1,680	1,680	1,680	1680	1,680

Source: The LPA Group Incorporated, 2006
Note
(1) Based upon 110% capacity of forecast demand
(2) Based upon 15,000 gallon tank
(3) Based upon 8,000 fuel truck
(4) Based upon 1200 Jet A Fuel Truck
(5) Based on average area of 840 SF per tank for safety and operational areas

In order to accommodate fuel demand as well as new environmental regulatory requirements, JAA intends to remove the two older underground fuel tanks and replace with two larger (approximately 12,000 gallons each) above ground fuel tanks east of the existing terminal facilities. As a result, the apron east and south of the terminal is planned for expansion to accommodate existing and anticipated demand.

FBO Terminal Building

A building condition survey performed in October 2000, determined that the Herlong Terminal Facility were in fair to good condition. Since the existing terminal facilities were renovated in 2001 to add more pilot amenities, the building is now in excellent condition and was expanded to approximately 2,000 SF.

The Terminal Building provides a pilot lounge, two conference rooms, restrooms, kitchen, and office facilities for Airport and Fixed Based Operator (FBO) staff. JAA serves as the Fixed Base Operator at Herlong, and provides the airport terminal, hangar space, tie-down areas, and fueling facilities at the airport. In addition, the FBO staff, including airport management, is responsible for airport inspection and maintenance, security, and overall operational control.

Appendix 5 of FAA AC 150/5300-13 provides guidelines for small airport buildings, including GA terminals. The primary consideration is that the facility be capable of handling the amount of passengers, pilots and visitors associated with peak hour operations. GA facility sizing can vary from 50 to 75 square feet per peak hour passenger. Therefore, a planning guide of 62.5 square feet per busy hour passenger is typically used to size GA terminal facilities.

Utilizing the above referenced sizing criteria and based upon the current and forecast level of demand, a 1,723 square foot FBO/GA Terminal will be required sometime after 2025. **Table 4-24** outlines the FBO/GA terminal building requirements over the planning period.

TABLE 4-24
FBO/GA TERMINAL BUILDING REQUIREMENTS

Year	Peak hr Local	Local Pax	Peak Hour Itinerant	Itinerant Pax	Pilot	Total Area
2005	5	4	4	13	5	1,387
2006	5	4	4	13	5	1,387
2010	5	5	5	14	5	1,455
2015	5	5	5	15	5	1,544
2020	6	5	5	15	5	1,634
2025	6	6	5	16	6	1,723

Source: The LPA Group Incorporated, 2006

Based upon this mathematical calculation, it appears that adequate facilities exist to accommodate demand. However, based upon the existing configuration and discussions with airport management and users, an addition to the terminal facilities, including additional maintenance equipment storage is recommended. Further analysis of this demand is evaluated in **Chapter 5**, *Alternatives Analysis,* Support Facilities.

Automobile Parking Requirements

Public parking at the Airport includes parking areas located along the east and west edges of the airport entrance road, adjacent to the new bulk hangar to the west of the entrance road and another parking area to the north of the new T-Hangar facilities along the northwest side of the airfield. Access to all of these parking facilities is through the main access road along Normandy Boulevard. Most automobile parking is located outside the perimeter fence line. However, there are five parking spaces located within the perimeter fence adjacent to the terminal facility.

The 28 parking spaces along the east edge of the Airport Road and seven spaces along the west edge of the entrance road serve as the primary parking area for many of the airport's tenants and visitors. Due to the location of parking spaces in relation to the main entrance road and airfield gate, vehicles entering or exiting the secure area via Gate 1 are often times delayed as a result of visitors either entering or leaving the parking areas located on the east and west side of the entrance road. Vehicles are typically not delayed more than a minute or two, but on busy days, specifically Saturdays and Sundays, parking along

the entrance road increases the congestion to and from the airfield facilities. As a result, it is recommended that parking especially along the east side of the entrance road be removed and relocated to an alternate location. This will be discussed in more detail as part of the *Alternative Analysis,* Support Facilities discussion, in **Chapter 5** of this report.

During peak days of the week (usually Saturday) and special events, parking both inside and outside the perimeter fence is inadequate. Airport users who have automobile access to the airfield often park on the ramp and above the underground fuel tanks due to lack of available spaces.

However, during visits to the Airport, the parking facilities, adjacent to the T-Hangars, are not used to any significant degree. This may be due to the fact that many T-hangar users often park their vehicles inside their hangar. An evaluation of automobile parking including the location and the number of facilities needed is evaluated in greater detail in the Alternatives Analysis section of this report. An approximate number of parking spaces available are listed in **Table 4-25**, *Existing Automobile Facilities*.

TABLE 4-25
EXISTING MARKED AUTOMOBILE FACILITIES
(Airport Related Only)

Location	Number of Spaces
Outside Perimeter Fence line	
West Side of Entrance Road	7
East Side of Entrance Road	28
North of new T-hangar Facilities	25
Adjacent to Bulk Hangar	46
Inside Perimeter Fence line	
Adjacent to Terminal Facilities	5
TOTAL	**111**

SOURCE: JAA AND THE LPA GROUP INCORPORATED, 2005

In addition to parking facilities outlined in **Table 4-25**, individual airport tenants and airport buildings, such as White Line Trucking and the Accessory Overhaul Group, which are not located near the Terminal Building have their own individual parking facilities.

GA PASSENGERS AND AUTOMOBILE PARKING

GA Passengers

A historical record of GA passengers for HEG does not exist and therefore, required an estimate of the current level of passengers based upon the level of GA operations. This task was accomplished utilizing the typical load carried by the GA fleet as published in the aviation economic guidelines by the FAA's "Estimating the Economic Impact of Airports". Standards set forth in this document establish an

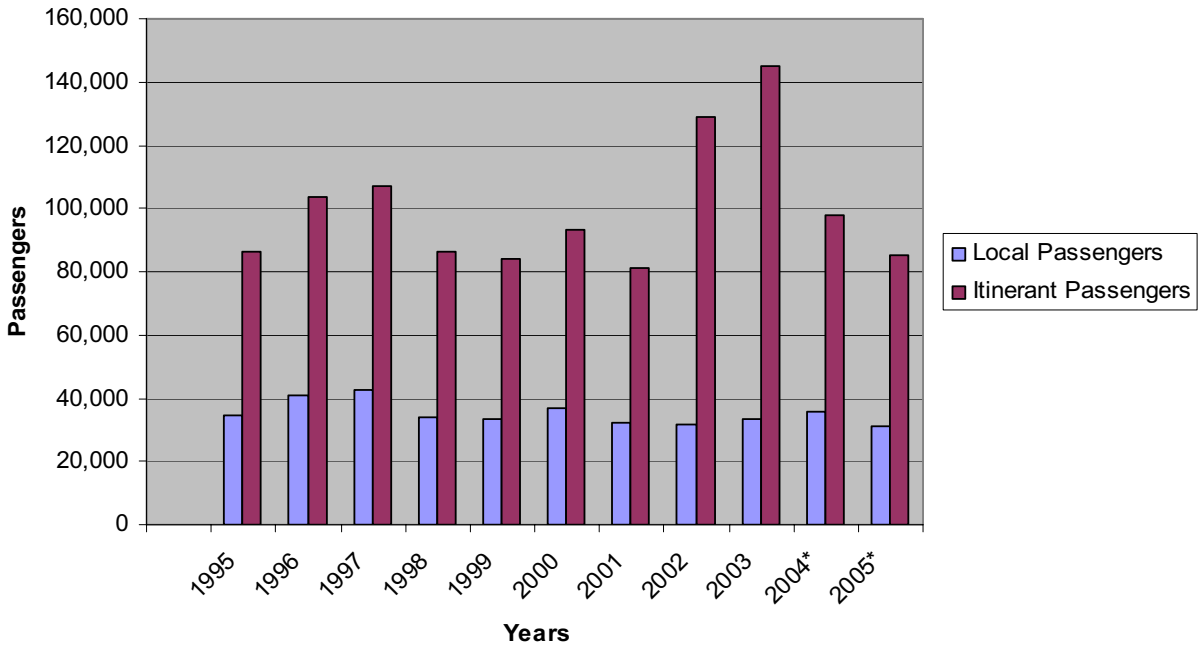
estimate of three passengers per itinerant operation and 0.9 passengers per local operation in addition to the pilot. This information is presented in **Table 4-26** and **Figure 4-4.**

TABLE 4-26
GENERAL AVIATION PASSENGERS

Year	Local Operations	Local Passengers	Itinerant Operations	Itinerant Passengers	Total Passengers
1995	38,190	34,371	28,810	86,430	120,801
1996	45,657	41,091	34,443	103,329	144,420
1997	47,218	42,496	35,621	106,863	149,359
1998	38,034	34,230	28,692	86,076	120,306
1999	37,050	33,345	27,950	83,850	117,195
2000	41,154	37,039	31,046	93,138	130,177
2001	35,910	32,319	27,090	81,270	113,589
2002	35,000	31,500	43,000	129,000	160,500
2003	37,410	33,669	48,290	144,870	178,539
2004*	39,900	35,910	32,528	97,583	133,493
2005*	34,761	31,285	28,340	85,020	116,305

Source: HEG Airport Management, FASP 2005, FAA TAF and LPA Group (2005)
*Note: Determined from Airport Records 5010

FIGURE 4-6
GENERAL AVIATION PASSENGERS



Automobile Parking

General public automobile parking at HEG is offered at several locations. At the terminal facility, approximately 28 parking spaces are provided along the eastern edge of the airport entrance road and seven parking spaces along the western edge. A total of 46 parking spaces are provided adjacent to Hangar 5 west of the terminal building, and 25 parking spaces are located north of the T-Hangar facilities along the west side of the airport. This provides a total of 111 spaces. However, these spaces are not located to meet the demand for parking.

Respective tenants, such as Mercair, Royal Atlantic, Acme Barricades and Advanced Disposal exclusively use their parking spaces and were not considered as part of this analysis. Access to the T-hangar units is provided via Normandy Boulevard from the west and Herlong Avenue from the east. Parking spaces are available at the FBO facility, but it is an accepted practice that based aircraft owners normally prefer to park their vehicles inside or close to their leased hangar space.

Discussions with Airport Management and site visits revealed several automobile parking issues specifically related to overcrowding and lack of access to the terminal facilities. Using the annual GA passenger data previously discussed and a planning factor of 1.5 parking spaces per existing busy hour passenger, it was estimated that at a minimum 40 parking spaces would be required to accommodate peak hour demand adjacent to the terminal facilities.

In order to accommodate anticipated demand, GA pilots, passengers, and visitors use the parking areas at HEG. Future GA parking requirements use a planning factor of 1.3 parking spaces per busy hour GA passenger and pilot and 44 square yards per parking space, which accounts for parking and circulation. Thus, approximately 37 parking spaces and 1,634 square yards of pavement area will be required in 2025. The forecast requirements for the FBO parking area over the planning period are listed in **Table 4-27**. The planning factors used in this section for GA parking are based upon suggested ratios from the "FAA Aviation Demand and Airport Facility Requirement Forecasts for Medium Air Transportation Hubs". The space requirements identified should accommodate the forecast levels of GA pilot, passenger, customer, visitor and employee parking demand.

TABLE 4-27
TERMINAL AREA AUTOMOBILE PARKING REQUIREMENTS

Year	Busy Hour Passengers and Employees	Required Parking Spaces	Required Parking Area (SY)
Base Year			
2005	23	30	1,327
Forecast Years			
2006	23	30	1,327
2010	24	32	1,388
2015	26	33	1,470
2020	27	35	1,552
2025	29	37	1,634

Note: One employee is required for each 30 busy hour passengers
Source: The LPA Group Incorporated, 2006

At the time of this writing, automobile parking adjacent to the terminal building, both inside and outside of the perimeter fence, consisted of 40 spaces which adequately accommodates peak hour demand. However, based upon discussions with airport management and observations, the location of the terminal parking, especially adjacent to the perimeter fence line along the entrance road should be reconfigured to alleviate congestion in and around the access road and access gate. Alternative automobile parking is discussed in more detail within following chapter under Support Facilities.

Security Fencing

Despite increased and extensive airport security measures with which commercial service airports have been required to comply, GA airports, historically, have not been subject to Federal rules regarding airport security. Prior to the creation of the Transportation Security Administration (TSA) in 2001, the Federal Government's role in airport security was focused exclusively on airports serving scheduled operations. Vulnerabilities exist throughout the transportation system, especially within general aviation. The TSA has not officially required GA airports to implement security measures, although there have been several efforts to establish a standard security program that would govern the entirety of the GA industry. It is, however, precisely the diversity and extent to which the industry is vulnerable that suggests a one-size security program is not suitable. The security needs and susceptibility of a

privately owned rural airport is vastly different from that of a large GA facility located near a major metropolitan area. A security program should instead focus on managing the risk associated with GA airports, recognizing the characteristics that define each facility.

The types of threats that exist for GA airports that do not have a security presence are numerous. Specifically, illicit actions related with aircraft theft, drug smuggling, illegal immigration, as well as vandalism have been problematic in the State of Florida. Small airports generally outside the scope of security found at larger airports, especially those that are not Part 139 certified, are particularly vulnerable to these types of threats.

As a result, the Florida Department of Transportation not only recommends perimeter fencing, but also the development and implementation of a security operations plan, the use of airfield and perimeter lighting, security signage and even physical and electronic surveillance as warranted by the amount and type of operations as well as the potential threat level. In addition, FDOT in conjunction with the AAAE and NBAA are in the process of testing new GA security procedures and equipment at various size airports around the state. The intent of this program is to limit the theft of equipment, including aircraft, as well as vandalism.

While the majority of the airfield is enclosed with a six foot security fence, a large section of the property south of the airfield is not due to heavy vegetation and trees. It is recommended that security fencing remain a priority throughout the planning horizon, especially with the development of the southern portion of the airfield. Based upon the types of threat, level of proposed development as well as FAA and FDOT requirements, several security recommendations are discussed in **Chapter 5** as part of the alternatives analysis.

SUMMARY OF FACILITY REQUIREMENTS

Table 4-28 provides a summary of the facility requirements based upon anticipated demand necessary to satisfy the forecasts of aviation demand presented earlier in this study. The order in which these improvements are listed is not meant to imply a priority or phasing of these projects. Essentially, this table includes the minimum facility requirements over the 20-year planning period based on the projected demand. During the alternatives analysis, the full development potential of areas at HEG will be considered even if it exceeds the minimum levels identified in this analysis. This will be considered the ultimate development scenario. Looking beyond these minimum requirements should provide airport management with information in order to make appropriate decisions if growth in one activity area increases faster than projected.

TABLE 4-28 SUMMARY OF FACILITY REQUIREMENTS	
Runways and Taxiways	1. Conduct routine pavement maintenance on all runways and taxiways. 2. Add signage at intersection of 11-29 and closed runways to limit runway incursions as well as add signage adjacent to Taxiway A and Runway 7-25 in conjunction with airfield improvements, such as distance to go and additional taxiway exit signs. Also, replace any old or damage signs as part of signage program. 3. Extend Runway 7-25 to accommodate anticipated demand. 4. Extend Taxiway A to provide full-parallel to Runway 7-25 and additional MITL. 5. Refurbish crosswind runway, 11-29 6. Re-surface and remark closed runways as taxiways 7. Install MITL on closed runways 8. Construct new turf runway to support light aircraft movements. 9. Rehabilitate pavement on Taxiways C and D.
General Aviation	1. Construct at least 27 T-hangar units 2. Construct 6 Corporate Hangars 3. Construct 8 Conventional Hangars 4. Construct at least 24,442 SY of additional aircraft storage apron
Airport Support Facilities	1. Relocate electrical vault. 2. Upgrade security fencing, and incorporate FDOT Security Requirements. 3. Relocated/reconfigure automobile parking spaces adjacent to Airport Entrance Road. 4. Close underground fuel tanks and replace with 12,000 gallon above ground fuel tanks.
Documentation	1. Develop Pavement Condition Report 2. Develop Airport Signage Plan 3. Update GA Airport Security and Contingency Plan per FDOT/FAA Requirements

CHAPTER FIVE
Airport Alternatives Analysis

GENERAL

The primary objective of this chapter is to identify an overall development plan for Herlong Airport (HEG) to meet the Airport's long-term aviation needs. In Chapters 3 and 4, landside and airside facilities were determined over the twenty-year planning period based upon forecast demand. Thus, the next step in the master planning process was to evaluate potential alternative concepts to address this demand. Since the combination of possible concepts is limitless, intuitive judgment was applied to identify those concepts that have the greatest potential for implementation. These choices provide the underlying rationale for the preferred recommendation. Implementation of the selected concepts is defined in subsequent chapters.

DEVELOPMENT CONSIDERATIONS

Prior to determining ultimate development, various airside, landside, terminal area and general airport requirements were identified in Chapter 4, *Airfield Demand/Capacity Analysis & Facility Requirements*. The evaluation criteria for each of these requirements varies based upon the particular functional area. In general, similar criteria were used to measure the effectiveness and the feasibility of the various growth options available. Criteria used in the concepts review and evaluation process are grouped into four general categories. These include:

- Operational Performance – Any selected development concept should be capable of meeting the Airport's facility needs (capacity, capability and efficiency) as they have been identified for the planning period. Further, preferred options should resolve any existing or future deficiencies as they relate to Federal Aviation Administration (FAA) design and safety criteria.

- Environmental – Airport growth and expansion has the potential to impact the Airport's environs. The selected plan should seek to minimize impacts in the areas outside the Airport's

boundaries. Concepts should also seek to obtain a reasonable balance between expansion needs and off-site acquisition and relocation needs. The preferred development plan should also recognize sensitive environmental features that may be impacted by the concepts evaluated herein.

- Cost – Some concepts may result in excessive costs as a result of expansive construction, acquisition, or other development requirements. In order for a preferred concept to best serve the Airport and the community, it must satisfy development needs at reasonable costs.

- Feasibility – The selected concepts should be capable of being implemented. Therefore, they must be acceptable to the FAA, Florida Department of Transportation (FDOT), Jacksonville Aviation Authority (JAA), and the community served by the Airport. The preferred development options should proceed along a path that supports the area's long-term economic development and diversification objectives.

Using the evaluation criteria, each proposed concept was evaluated based upon anticipated long-term planning goals and development needs. Proposed development concepts were presented in separate but interrelated functional areas of the Airport. These are:

- Airfield Development
- Land Use/Land Acquisition
- Landside Facilities – Building Areas
- Landside Facilities – Support Facilities and Surface Access

Functional areas were further subdivided into primary and secondary elements. Primary elements typically consist of large areas of land, and, therefore, the airfield configuration represents the primary element within this study. Secondary elements, such as terminal area, general aviation, and access and support facilities were evaluated both individually and collectively to ensure the orderly evolution of a final master plan concept that is functional, efficient, cost effective, and compatible with the environment.

Based upon each respective concept analysis and comments received from Airport management, JAA Staff, the Technical Advisory Committee, City of Jacksonville Planning and the public, a recommended development concept was developed which forms the basis of the Airport Layout Plan (ALP) Drawing set.

City of Jacksonville Planning and Development

Proposed airfield and landside alternatives at HEG considered the policies and objectives outlined in the City of Jacksonville (COJ) 2010 Comprehensive Plan with regard to land development around civilian airports and to a limited extent transportation concurrency. Florida Growth Management Laws, specifically Chapter 2005-290, defines Capital Improvement requirements in relation to the COJ Plan and Florida Department of Transportation Comprehensive Plan. Land Development around Civilian Airports and Airfields and a portion of the Florida Growth Management Law, Chapter 2005-290, related to aviation facilities are provided in Appendix G of this report.

As required by Chapter 2005-290, members of the Jacksonville Metropolitan Planning Organization, who participated on the Project Technical Advisory Committee (TAC), were involved in the planning and programming of transportation facilities at the airport. Thus, proposed development as outlined within the Airport Master Plan Update was provided to the COJ Planning Department for inclusion into the long-range transportation plan. As a result, the long-range transportation plan should include both long and short-range strategies which comply with state and federal requirements. The purpose of the long-term transportation plan is to preserve the existing transportation structure as well as improve mobility.

The long-range plan also assessed capital investment and other measures necessary to enhance or make more efficient the use of existing transportation corridors. Thus, based upon coordination with the TAC, transportation concurrency to a limited degree was considered with regard to proposed landside development on the airport. Transportation concurrency considers the impact of proposed aviation development on local roads to determine if sufficient capacity is or will be available. Detailed project trip generation and roadway capacity determinations were not part of the scope of this project; therefore, it is recommended that detailed trip generation information be provided as part of future landside design development.

Previous Master Plan

In the process of evaluating potential airfield development, the previous Master Plan Update was reviewed to identify trends and issues, which may impact future development at the Airport. An evaluation of the previous demand capacity analysis revealed that HEG will not reach the 60 percent capacity threshold until beyond the original planning period, approximately 2020. This capacity assessment was verified during the current master plan analysis, and revealed that HEG will not exceed its capacity based upon annual service volume (ASV) until after 2025.

Based upon facility requirements identified in the previous 1992 and 2000 Master Plan Updates, the

following on-airport development was identified:

- T-Hangar Development (1992 and 2000 MPU)
- Bulk Storage Hangar Development (1992 and 2000 MPU)
- Retention/Detention Basin Construction (1992 MPU)
- Vehicular Road Construction and Entrance Road Realignment (1992 and 2000 MPU)
- Apron Expansion (1992 and 2000 MPU)
- Industrial Park Development (1992 MPU)
- ILS Installation (1992 and 2000 MPU)
- Runway 7 extension of 1,400 feet (1992 and 2000 MPU)
- Parallel runway 7R-25L (3,100 x 75 feet) (1992 MPU)
- General Aviation Facility Development (1992 and 2000 MPU)
- Turf Runway Development (2000 MPU)
- Install Fencing (2000 MPU)
- Residential Fly-In Community Development (2000 MPU)
- Renovate Terminal Building (2000 MPU)
- Upgrade Airfield Lighting (1992 and 2000 MPU)
- Construct Taxiways E, F, G and K (2000 MPU)

A number of the previous short and mid-term goals as outlined in the previous two master plans have been implemented including T-hangar development, bulk hangar construction, construction of a central/detention basin, terminal rehabilitation, fencing, and upgrades to airport lighting. Consideration was given to these concepts as part of this master plan analysis in order to limit the number of potential options as well as address existing and future demand requirements.

Since its transfer to JAA, HEG has remained a general aviation reliever and recreation airport even after the conversion of Cecil Field from a military to public use facility within the Jacksonville Aviation Authority System. As a result of the dynamics between the airports (Jacksonville International, Craig, Herlong and Cecil Field Airports) within the JAA System, an airport improvement strategy was developed to include an evaluation of several preliminary concepts. This development strategy was used to identify ultimate runway lengths, future airfield development and revenue generation options.

PREFERRED CONCEPT SUMMARY

The preferred aviation development concept for HEG was created through discussions with the Airport Sponsor, the Airport Technical Advisory Committee, including the COJ Planning Department, and the

general public through a qualitative and quantitative assessment process. For each development area, several alternatives were conceptualized and further analyzed using an evaluation scoring matrix. The evaluation scores afford the most measurable assessment of each concept and highlight deficits/surpluses in providing for future demand.

The preferred development concept combines options identified in Airfield Concept III, North GA Concepts II and III, Mid-Field Concept II, the East and West Commerce Park and South Development Concept I. Based upon existing and forecast market demand, this combination of concepts is anticipated to ensure that on-airport land use will be served by development likely to augment forecast demand. The preferred concept proposes a 2,000 foot turf runway and an extension to Runway 7. Alternative III provides JAA the flexibility to provide a 500-foot or 600-foot extension due to potential costs associated with runway lighting relocation. Either option will increase the total usable runway length as well as provide overrun pavement beyond each threshold. The runway stopways provide an additional measure of safety, and are recommended as a direct result of both TAC and Public input. The recommended development concept also proposes several taxiway improvements to provide access to underutilized portions of the airfield as well as incorporates a new precision LPV instrument approach to both Runways 7 and 25, thus increasing approach and visibility minimums.

The preferred North GA Concept addresses the need for variable hangar space to accommodate both large and small aircraft through the construction of T-hangar, conventional and corporate hangar space as well as provides areas adjacent to Normandy Boulevard for non-aviation development. Further, both the South Development Industrial Park and East Commerce Park propose a combination of compatible non-aviation and aviation related development in order to buffer the airport from encroaching residential neighborhoods while providing additional sources of revenue diversification and generation for the airport. Finally, the Midfield Concept II provides JAA the flexibility to address hangar storage needs related to anticipated corporate and GA traffic. The Mid-Field Concept also envisions the development of a new FBO/Maintenance facility supported by a new aircraft parking apron.

DEVELOPMENT CONCEPTS

Runway Length Analysis

The runway is the principal facility of an airfield as it serves as the primary method for aircraft to access airfield facilities. It is vital to ensure that the runway has the proper length, width and strength to safely accommodate aircraft expected to operate on it. In this section, the existing runway length was

evaluated to determine if the runway could safely accommodate both existing and future critical aircraft requirements.

The existing runway lengths at HEG are: 7-25 (4,000 feet) and 11-29 (3,900 feet). Runway length and width requirements are presented in **FAA AC 150/5300-13, Change 10**, *Airport Design*. These design standards are based upon a critical aircraft's approach speed, wingspan and the approach minimum for that runway. Based upon discussions with management, an ARC B-II group aircraft (i.e. King Air 90, Citation Jet I and Dassault Falcon 20) represents the most demanding aircraft (e.g. "critical aircraft") currently using the airport. However, HEG is used on a limited basis by ARC Group C-II aircraft, including Learjet 60 and Citation X aircraft, which, at the time of this writing account for approximately 260 annual operations. Based upon forecast data, operations by C-I and II ARC Group aircraft are projected to increase to more than 610 by 2010 and over 3,000 by the year 2025. However, if the use of VLJs is higher than expected, it is anticipated that the number of C-I and C-II aircraft could increase exponentially. For this reason, the critical aircraft used for this analysis was a C-II.1 The forecast demand of over 500 total annual operations supports the master plan's recommendation for a longer runway at HEG. Therefore, the master plan recommends the critical aircraft be changed to a C-II.

The runway length analysis was conducted in accordance with the guidelines provided in FAA AC 150/5325-4A, FAA Airport Design Software (Version 4.2D), and the manufacturer's airplane characteristics manuals. These calculations take into account variable conditions including airport elevation, mean temperature, stage length and runway gradient. The runway length determination also accounts for critical aircraft data such as payload, landing and takeoff weight.

Runway length requirements were initially calculated for the critical class aircraft using FAA AC 150/5325-4A and the FAA's Airport Design Software. Use of this analysis provides a general picture of runway length for various groups of aircraft and provides a starting point for the review. This initial analysis was based on the following assumptions specific to HEG which are shown in **Table 5-1**.

[1] Existing demand is based upon discussion with the local FBO and letters received from interested users requesting a longer runway. Currently, some C-I and C-II aircraft (primarily the Citation X, Falcon 900 and some Learjets which account for approximately 260 annual operations) fly to and from HEG using take-off weight restrictions. Letters from interested parties are included in Appendix F of this report.

TABLE 5-1 AIRPORT DATA	
Airport Elevation	87 Feet
Mean Daily Maximum Temperature of the Hottest Month	97.1º F
Maximum Difference in Runway Centerline Elevation	6 feet
Average Length of Haul	1,000 Miles
Runway Conditions	Wet & Slippery
Source: The LPA Group, Incorporated, 2006	

For this analysis, it assumed that the existing fleet changes from B-II (i.e. King Air 90) to C-II (i.e. Citation X) and that the average stage length is 1,000 miles. This data was used to calculate the recommended runway lengths using the FAA Software. These results are displayed in **Table 5-2**.

TABLE 5-2 RECOMMENDED RUNWAY LENGTH	
Aircraft Description	**Required Takeoff Length**
Small airplanes with approach speeds of less than 30 knots	300 feet
Small airplanes with approach speeds of less than 50 knots	810 feet
Small airplanes with less than 10 seats:	
75 percent of these small aircraft	2,600 feet
95 percent of these small aircraft	3,180 feet
100 percent of these small aircraft	3,760 feet
Small airplanes with more than 10 seats	4,440 feet
Large airplanes of 60,000 pounds or less:	
75 percent of these large airplanes at 60 percent useful load	5,470 feet
75 percent of these large airplanes at 90 percent useful load	7,350 feet
100 percent of these large airplanes at 60 percent useful load	5,830 feet
100 percent of these large airplanes at 90 percent useful load	9,460 feet
Airplanes of more than 60,000 pounds	Approximately 5,990 feet
Source: FAA Airport Design Software, Version 4.2D, 2005	

The runway lengths were calculated using the FAA Airport Design Software, Version 4.2D; however, this only provides a rough estimate commonly used for long-term planning purposes. Based upon the data provided in **Table 5-2**, a runway length of at least 4,440 feet should be provided. However, it should be noted that these calculated runway lengths are often shorter than designated manufacturer and insurance company requirements. In order to obtain a more accurate runway length requirement, the FAA recommends in **AC 150/5325-4A** that individual length analyses be conducted for critical aircraft operating at the airport.

As a result, the critical runway length was obtained from manufacturer specifications. Using a number of variables, such as temperature, airfield elevation, and aircraft load characteristics, the aircraft specification manuals provide more realistic and accurate runway length requirements based upon aircraft demand.

Table 5-3 lists the group of critical aircraft that operate or is expected to operate at HEG and the manufacturer's recommended runway length requirements. The recommended runway length requirements data is for aircraft at Maximum Takeoff Weight (MTW), at sea level and with standard ISA temperature (59º F). The runway lengths given by the manufacturer are then adjusted to the airport elevation and temperature at HEG.

Airport Elevation Adjustment

The runway length was adjusted to consider the effect of airport elevation on aircraft performance - the higher the airport elevation, the less dense the air. This lack of density requires additional runway length to obtain more speed. As a result, the runway length was adjusted by a rate of 1 percent per 984 feet above sea level. The airport elevation at HEG is 87 feet MSL; therefore the runway length was increased by 0.08 percent.

Temperature Adjustment

The runway length requirement was also adjusted to consider the impact of temperature on the aircraft performance. Higher temperatures have an adverse effect on aircraft performance, especially jet turbine aircraft. Jet engines rely on the difference in temperature inside and outside the engine to produce thrust. Therefore, as the temperature outside increases, the engine becomes less efficient and requires additional runway length to build the necessary thrust to become airborne. The required runway length was adjusted for temperature by a rate of 1 percent for every 1 degree Celsius. The mean temperature during the hottest month at HEG is 91.7º F or 36.16º Celsius, while ISA temperature at sea level is 59º F or 15ºC. This is a difference of 32.7º F or 21.16º C. This difference resulted in a runway length increase of 21.16 percent.

Pavement Conditions

Finally, the runway length was calculated assuming that the runway is wet. Wet runway conditions also require more runway length. The required runway length is derived by applying a 15 percent increase to the previously calculated runway length requirements. The results of these calculations are depicted in **Table 5-3**.

TABLE 5-3
RUNWAY LENGTH CALCULATION FOR EXISTING AND POTENTIAL AIRCRAFT AT HEG

Aircraft	MTW (lbs.)[1]	Manufacturer's Runway Length Recommendation[2]	Calculated Runway Length Requirement[3]	Wet Runway Length Requirement[4]
*Beech Jet 400	16,100	4,169	5,054	5,813
*King Air 90	10,100	2,625	3,435	3,950
Falcon 10	18,740	4,450	5,395	6,204
Learjet 28/29	18,740	4,075	4,941	5,682
Learjet 24	13,500	4,300	5,213	5,995
Learjet 25	15,000	5,118	6,205	7,136
*Learjet 31A	16,500	3,280	3,977	4,573
Premier Jet	12,500	3,792	4,597	5,287
*Citation Jet (CJ1/CJ2)	10,400	3,080	3,734	4,294
Citation Excel	18,700	3,414	4,139	4,760
*Citation II	13,500	2,990	3,625	4,169
Citation Ultra	16,300	3,180	3,855	4,434
Jetstream 31	16,204	4,350	5,274	6,065
TBM 850	7,394	2,840	3,443	3,960
SJ30-2	13,500	3,515	4,262	4,901

**Denotes aircraft currently using HEG*
Data of Aircraft Manufacturer Runway Length Recommendation comes from the aircraft manufacturer's website and published manuals.
[1] Maximum Allowable Takeoff Weight (MTW) comes from the manufacturer's website or published manuals.
[2]. The recommended runway length is for aircraft at MTW at standard ISA, at sea level.
[3]. Runway length was determined by adjusting the manufacturer's recommended runway length for the elevation (increased by 0.08%) and temperature (21.16%) at HEG.
[4]. Wet runway length was calculated by applying a 15% increase to the calculated runway length
Source: Aircraft Manufacturer runway length requirements and The LPA Group, Incorporated, 2006

Currently the longest available runway at HEG has a length of 4,000 feet (Runway 7-25). At this length, only 35.7 percent of the listed aircraft can takeoff at maximum takeoff weight (MTW) under dry runway conditions, while only the TBM 850 can takeoff at MTW during wet runway conditions. Extending the runway an additional 500 to 600 feet, providing a length of 4,500 to 4,600 feet, would increase the percentage of aircraft that can takeoff at MTW under dry runway conditions to 50 percent and increase the percentage to 28.5 percent under wet runway conditions. Extending the runway to 5,000 feet would increase the percentage to 64.2 percent under dry runway conditions and 50 percent under wet runway conditions. Both extensions would constitute an increase in the operational capacity for the aircraft operating at the airfield. It is important to note that an environmental assessment (EA) may or may not be triggered by the extension since an EA is typically triggered by potential environmental impacts such

as wetland, noise, air quality, etc. It is the consultant's opinion that a short form EA should allow FAA to issue a FONSI for this project. The Master Plan Update recommends an extension to 4,500 feet. However, JAA should continue to analyze the increased operational capacity and additional safety margin provided by a 1,000 foot extension to serve the increasing demands of C-I and C-II aircraft as part of the design development prior to construction. JAA should also analyze the cost of upgrading the runway lighting systems as a part of the extension project.

Instrument Approach Analysis

The Airport is located in a one-mile "cut-out" of Cecil Field Class D airspace and is surrounded by the Class D airspace associated with NAS Jacksonville to the east and Naval Outlying Field (NOLF) Whitehouse to the northwest as well as the Class C airspace of Jacksonville International Airport to the North. In addition, a significant amount of military training occurs within the special use airspace (SUA) surrounding HEG. Special use airspace areas include: Alert Areas, Military Operating Areas (MOAs), and Restricted Areas (RAs), which are located east, north and west of HEG. The special use airspace areas typically have a high volume of rotary and high-speed fixed wing activities and can have ceilings as high as 17,500 feet.

As part of the concepts analysis, the installation of a precision approach to either Runway 7 or 25 was considered. Currently, Runway 25 is designated as a non-precision instrument approach, and Runways 7, 11 and 29 are designated as visual only.

Air Traffic Control

HEG is surrounded by a combination of military and civilian airspace. There is no Air Traffic Control Tower (ATCT) at HEG; therefore, the airspace is categorized as Class E (uncontrolled) with floor of 700 feet MSL and extending upwards to 18,000 feet MSL. However, HEG is surrounded by Class D and C airspace due to its proximity to the Whitehouse NOLF, Jacksonville NAS and Mayport NAS, as well as Jacksonville International Airport and Cecil Field. As a result, contact with Jacksonville Air Traffic Control is required to transit through Class C airspace associated with JIA and recommended during approach and departure procedures to HEG. In addition, aircraft transitioning through Class D airspace associated with Cecil Field, NAS Jacksonville and NOLF Whitehouse must also contact ATC prior to entering the terminal airspace.

It is anticipated that providing an ATCT facility at HEG would improve the hourly capacity of the airport while increasing safety due to the variety of aircraft operations that occur at the Airport. However, the cost of an ATCT is significant and recreational users do not desire an ATCT. An analysis of Air Traffic Control requirements is discussed in further detail within the Airport Support Facilities

section of this report.

GA Security Requirements

In the aftermath of the September 11, 2001 attacks, airport security came under intense scrutiny. Historically, GA airports have not been high-security facilities, and federal and state governments have not, to date, regulated GA airport security as it has done with commercial service airports. However, the main terrorist threat against GA and GA airports is considered the possible theft or hijacking of aircraft for use as potential terrorist weapons.

In May 2004, a report entitled, "Recommended Security Guidelines related to General Aviation Airports" was developed by State Aviation Officials from the continental United States, Puerto Rico and Guam. The report provides advice, recommendations and guidance to federal authorities for developing a national policy as well as appropriate standards of airport security for public-use general aviation airports. As a result, the FDOT in conjunction with the FAA is recommending the following best practices at general aviation airports throughout the State. These include:

- Prepare a comprehensive airport security plan which would be subject to periodic review and approval by the TSA and FDOT.
- Install adequate outdoor area lighting to help improve the security of (a) aircraft parking and hangar areas, (b) fuel storage areas, and (c) access points to the aircraft operations area.
- Institute criminal record background checks for all airport, fixed base operator (FBO) and airport tenant employees with access to the aircraft operations area (AOA). Criteria similar to that used in FAR Part 107 should be developed to determine what offenses would disqualify individuals from being granted access.
- Install security fencing to help prevent unauthorized access to the aircraft operations area, fuel facilities, and other sensitive areas.
- Install signage around the AOA, fuel facilities, and other sensitive areas to deter unauthorized entry.

Security related projects are eligible for GA Entitlement funding and limited state funding. However, GA security projects are ranked low and, therefore, have no priority for discretionary funding at this time. Therefore, the ability of the large majority of GA airports to implement the various recommendations will be contingent upon the provision of extensive financial assistance from federal, state, and local governments.

AIRFIELD CONCEPTS

Airfield facilities are, by their very nature, a focal point of an airport complex. Because of their role and the fact that they physically dominate a large portion of Airport's property, airfield facility needs are often the most critical factor in the determination of viable airport development concepts. In particular, the runway system requires the greatest commitment of land area and is often the greatest influence on the identification and development of other airport facilities

Furthermore, the runway and taxiway system directly affects the efficiency of aircraft movements, both on the ground and in the surrounding airspace. The runway and taxiway system also limits the ability of an airport to handle certain aircraft, which directly affects the types of air service an airport can offer or accommodate. Finally, the efficiency of aircraft movement is affected by local approach and departure procedures, which are influenced by local restrictions associated with noise, airspace congestion, and other considerations.

The objective of the airfield concepts section of this chapter is to derive concepts to address airfield deficiencies identified in the previous chapters and to provide the necessary facilities to meet the forecast demand over the 20-year planning period.

One of the key issues identified is the runway length deficiency. The longest runway length available at the airfield is 4,000 feet. However, an analysis of existing aircraft use indicates that several larger and heavier aircraft operate with a weight restriction (i.e. Citation Jet and Learjet), which limits their use at the Airport. The forecast indicates that operations by these aircraft will increase from 260 annual operations to over 900 during the twenty-year planning period. From the list of aircraft provided in **Table 5-2**, it was determined of these types of aircraft that only 35.7 percent can takeoff at maximum takeoff weight under dry runway conditions and only one aircraft under wet runway conditions at the current runway length of 4,000 feet. However, if the runway length is increased to at least 4,500 feet, then these percentages increase to 57.1 percent and 35.7 percent during dry and wet conditions, respectively. Therefore, the airfield concepts analysis considered development to increase runway length.

Runway 7-25 is the primary runway at HEG. Not only is this runway the longest on the airfield, it also has wind coverage over the 85 percent required by the FAA. Because of this, it is the primary candidate for the runway extension. In addition to variations of an extension to an existing runway, construction of a new runway based upon varying orientations was also considered. However, the construction of a new runway concept was abandoned due to cost, environmental issues and wind coverage.

Airfield Concept 1 (No Build/Limited Development)

Concept 1 was developed to show the most cost-conscious and efficient usage of existing airfield facilities. Only minor improvements to safety and capacity were chosen. Projects that were costly, created major changes to existing airfield configurations, had potential environmental impacts, or required land acquisition were eliminated from further consideration.

Projects associated with the "Limited Development" Concept included:

- Closed Runways pavement removal
- Taxiways (Closed runways) pavement overlay and repair
- Taxiways (Closed runways) marking and lighting
- Runway 7-25 Pavement Maintenance and Overlay
- Runway 7-25 Marking Removal and Remarking
- Runway 11-29 Pavement Maintenance and Overlay
- Runway 11-29 Marking Removal and Remarking
- Overlay Taxiways C and D
- Pavement Condition Report
- Signage Plan and Airfield Signage System Improvements, and
- Non-Directional Beacon, AWOS and Electrical Vault Relocation

Both Runways 7-25 and 11-29 would remain unchanged and would require pavement maintenance, overlay and remarking. However, this also means that the runway length deficiencies and required facilities to meet the future demand will not be addressed.

However, a number of projects including the rehabilitation of Runway 11-29 and the closed runways, the electrical vault relocation, and the pavement condition report costs will remain consistent throughout all three airfield concepts. Therefore, **Table 5-4** identifies projects which will remain consistent throughout the alternatives analysis, and **Table 5-5** identifies preliminary project costs associated with Airfield Concept 1 only. As a result, the estimated total magnitude costs for Airfield Concept 1 were estimated at $9,697,452, which includes a 20 percent allowance for engineering, design and contingency fees.

In developing cost estimates, no land acquisition was included since no on or off-site development is planned. The following is an order of magnitude cost estimate in 2006 dollars:

TABLE 5-4 AIRFIELD COSTS ASSOCIATED WITH ALL THREE CONCEPTS PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES	
Project Description	**Estimated Cost**
Runway 11-29 Pavement Overlay and Rehabilitation	$2,215,388
Runway 11-29 Marking Removal and Remarking	$297,317
Closed Runways Pavement Removal	$275,974
Taxiway Overlay and Repair (closed runways)	$1,151,009
Install Marking and Lighting on South Taxiways (Closed Runways)	$368,522
Pavement Condition Report	$30,000
Electrical Vault Relocation	$330,240
Design and Construct New Fuel Farm (2 Tanks)	$500,000
Replace AWOS	$200,000
Overlay Taxiways C & D	$1,700,000
Estimated Development Cost[1]	**$7,068,450**
[1] Project Costs include 20% engineering, design and contingency fee	
Source: The LPA Group, Incorporated	

TABLE 5-5 AIRFIELD CONCEPT 1 ONLY PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES	
Project Description	**Estimated Cost**
Runway 7-25 Pavement Overlay and Rehabilitation	$2,110,394
Runway 7-25 Marking Removal and Remarking	$304,525
Signage Plan	$19,400
Airfield Signage System Upgrades	$194,683
Estimated Development Cost - Airfield Concept 1[1]	**$2,629,002**
[1] Project Costs include 20% engineering, design and contingency fee	
Source: The LPA Group, Incorporated	

A listing of key strengths and weaknesses associated with Airfield Concept 1 is shown below:

AIRFIELD CONCEPT 1
"LIMITED DEVELOPMENT" SCENARIO

Source: The LPA Group Incorporated, 2006

Strengths	Weaknesses
1. Most cost efficient concept. 2. Limited impacts to existing facilities. 3. No environmental impacts or land acquisition required. 4. Provides improved airfield access to south airfield	1. Configuration accommodates only B-II aircraft. 2. Does not provide runway length to accommodate long-term demand 3. Does not eliminate the use of the grassy strip between Taxiway A and Runway 7-25 by Ultra light aircraft. 4. Does not provide facilities for larger aircraft 5. Does not meet forecast demand

Thus, a "Limited Action" concept in any of the functional areas identified would effectively limit future development at HEG to the existing airside configuration and thus would not accommodate forecast demand. Additional development, with the exception of tenant-funded projects, would be made over the 20-year planning period only when absolutely necessary.

Airfield Concept 2 (Constrained Development)

As recommended in **Table 5-3**, *Runway Length Calculation for Existing and Potential Aircraft at HEG*, extending Runway 7 by 500 feet to the south will provide the 4,500 foot length requirement. An extension to Runway 7-25 is the most feasible due to wind coverage and overall alignment. An extension to the Runway 7 threshold was chosen since it would have minimal impact to existing airfield facilities, would remain on existing airport property, and is anticipated to have minimal environmental impacts. Further, the associated Runway 7 protection zone and noise contours would also remain on airport property. Major projects associated with Concept 2 are outlined below and in **Figure 5-2**, *Airfield Concept 2*.

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Airfield Concept 1

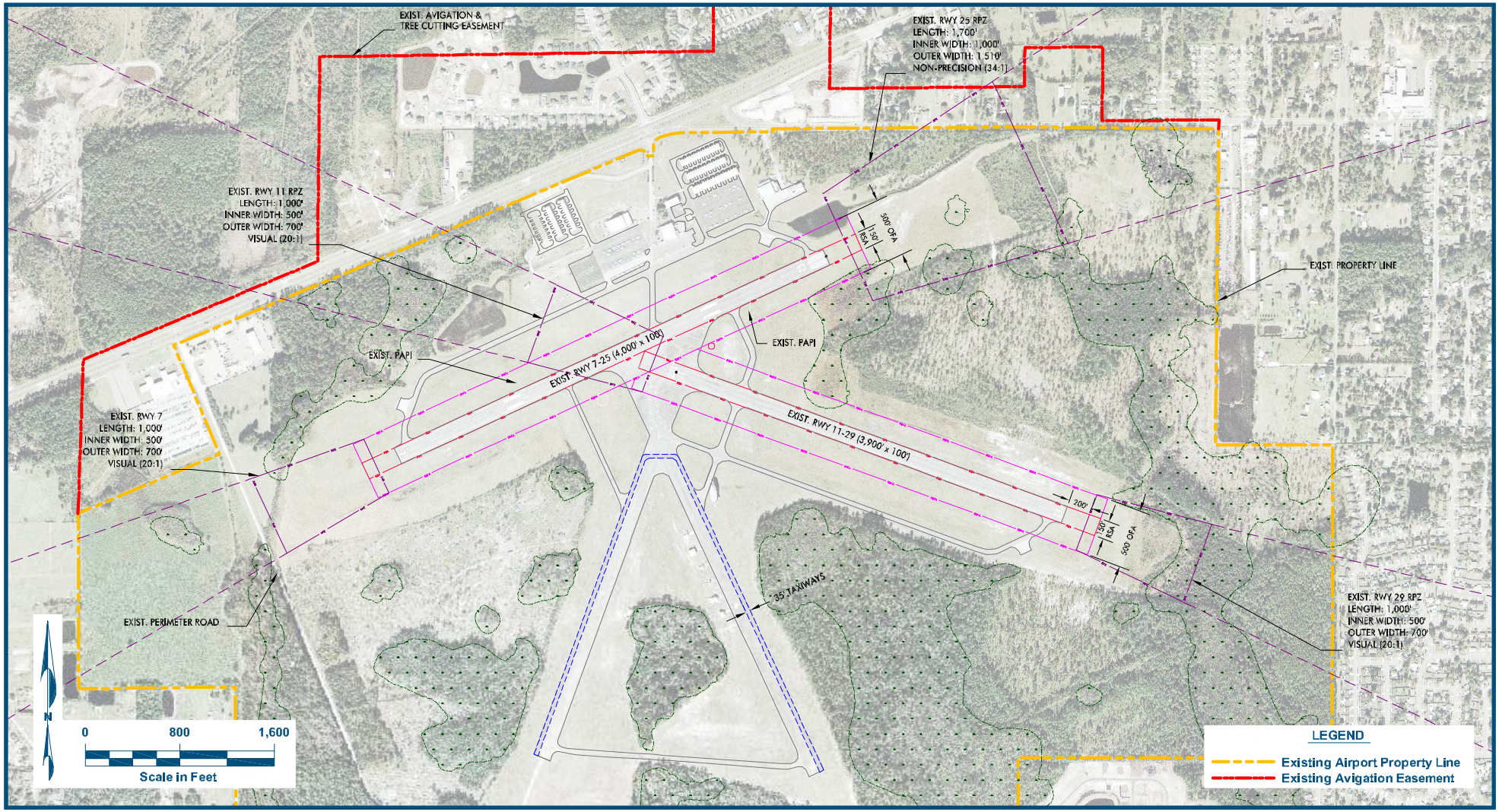

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Figure 5-1

In addition to projects outlined in **Tables 5-6** and **5-7**, major projects associated with Airfield Concept 2 only include:

- Relocate Runway 7 threshold 500 feet west
- Extend Taxiway A 500 feet to the west
- Install ILS Approach to Runway 25 including airport lighting system
- Relocate PAPI on Runway 7
- Construct connector taxiway between Runway 7 and Taxiway A
- Perimeter road relocation
- Convert closed runways to 35 foot taxiways
- Pavement maintenance and overlay
- Remark Runway 7-25 for precision instrument approach
- Mark and install MITL on converted runways, and
- Upgrade lighting on Runway 7-25

According to the FAA AIP Project Eligibility documentation, **FAA Order 5090.3** and **Order 7031.2**, a GA airport is eligible for an ILS with appropriate airport lighting system if it is included in the NPIAS system and the runway meets or is forecast to have sustained turbojet operations within five (5) years or meets annual instrument approach criteria (i.e. wind coverage, obstructions, NAVAID siting requirements, etc.). However, according to **FAA Order 5090.3C**, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, **Table 3-1**, *Fundamental Airport Development*, the introduction of satellite navigation will be able to support instrument approaches to virtually all runway ends, dependent upon satellite signal availability. Thus, with the advent of the global positioning system, installation of ILSs is decreasing and must be strongly justified. Consequently, in order to provide the option for a precision instrument approach, a Lateral Performance with Vertical Guidance (LPV) approach could also be used for Runway 25 due to wind and existing traffic patterns. An LPV approach requires high intensity runway lighting and a MALSR to allow the approach visibility to decrease to less than 3/4 statute mile.

With the installation of a precision approach to Runway 7-25, the runway markings should be upgraded in conformance with **AC 150/5340-1J**, *Standards for Airport Markings*. Runway marking improvements include the installation of aircraft hold markings, touchdown zones and aiming points. As part of the precision approach system, a glide slope antenna would be installed to the south of Runway 25 and a localizer would be installed approximately 1,000 feet beyond the Runway 7 threshold. The Glide Slope Antenna (GS) is used to establish and maintain the aircraft's descent rate until visual contact confirms the runway alignment and location. As such, the GS antenna may be located on either

side of the runway but is recommended to be located on the side of the runway offering the least possibility of signal reflections from buildings, power lines, vehicles, aircraft, etc. The glide slope critical area, depending upon the system used, can range from 800 feet to 3,200 feet long by 100 feet to 200 feet wide. The critical areas associated with the existing and future precision instrument approach to Runway 25 are identified in **Figure 5-2**, *Airfield Concept 2*. In addition, the installation of a precision approach to Runway 25 will require the relocation and realignment of the airport perimeter road to minimize the impact to the localizer critical area. Further, the cost of an environmental assessment associated with the extension of Runway 7 was also considered as part of the development cost. Although environmental impacts likely to trigger an EA are not believed to be significant, this decision is beyond the scope of the consultant and, therefore, should be considered.

TABLE 5-6
AIRFIELD COSTS ASSOCIATED WITH ALL THREE CONCEPTS
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	**Estimated Cost**
Runway 11-29 Pavement Overlay and Rehabilitation	$2,215,388
Runway 11-29 Marking Removal and Remarking	$297,317
Closed Runways Pavement Removal	$275,974
Taxiway Overlay and Repair (closed runways)	$1,151,009
Install Marking and Lighting on South Taxiways (Closed Runways)	$368,522
Pavement Condition Report	$30,000
Electrical Vault Relocation	$330,240
Design and Construct New Fuel Farm (2 Tanks)	$500,000
Replace AWOS	$200,000
Overlay Taxiways C & D	$1,700,000
Estimated Development Cost[1]	**$7,068,450**

[1] *Project Costs include 20% engineering, design and contingency fee*

Source: The LPA Group, Incorporated

Land acquisition is limited to an avigation easement prior to the approach to Runway 25 to accommodate the precision approach. The existing use of this property is primarily commercial with a small amount of residential development (approximately three homeowners) according to the COJ Property Appraisers' Office. The estimated cost of **Table 5-7**, *Airfield Concept 2*, Preliminary Order of Magnitude Cost Estimates provide costs in 2006 dollars for the proposed development.

TABLE 5-7
AIRFIELD CONCEPT 2 ONLY
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES
IN 2006 DOLLARS

Project Description	Estimated Cost
EA Runway 7-25 Extension	$200,000
Signage Plan	$29,000
Airfield Sign System Upgrades including additional signage	$299,812
Runway 7 Extension*	$719,528
Runway 7-25 Pavement Rehabilitation and Overlay	$2,606,252
Taxiway A Extension including lighting	$535,395
Taxiway A Pavement Rehabilitation and Overlay	$1,305,000
Taxiway A Marking Removal and Remarking	$219,124
Runway 7 PAPI Relocation	$32,211
Install REILs on Runway 7	$50,000
Runway 7-25 Marking Removal and Remarking	$342,591
Replace and Relocate MIRL with HIRL on Runway 7-25	$288,482
Taxiway J - Design and Construct	$325,000
Acquire Runway 25 Avigation Easement (~1.7 acres)	$60,000
Installation of ILS System (Glideslope, Localizer and MALSR)	$1,950,000
Relocated Perimeter Road	$896,412
Clear obstructions on Runway 25	$82,000
Drainage Improvements*	$225,000
Total Development Costs[1]	**$10,165,807**

** Runway 7-25 extension includes 500 ft extension to Runway 7 only*
[1] Project Costs include 20% engineering and contingency fee
Source: The LPA Group, Incorporated, 2006

Thus, based upon proposed development, the total estimated cost associated with Airfield Concept 2 is **$17,234,257**. It is important to note that the implementation of an LPV approach rather than an ILS approach on Runway 25 would likely cost approximately $500,000 rather than the estimated $1.9 million.

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Airfield Concept 2

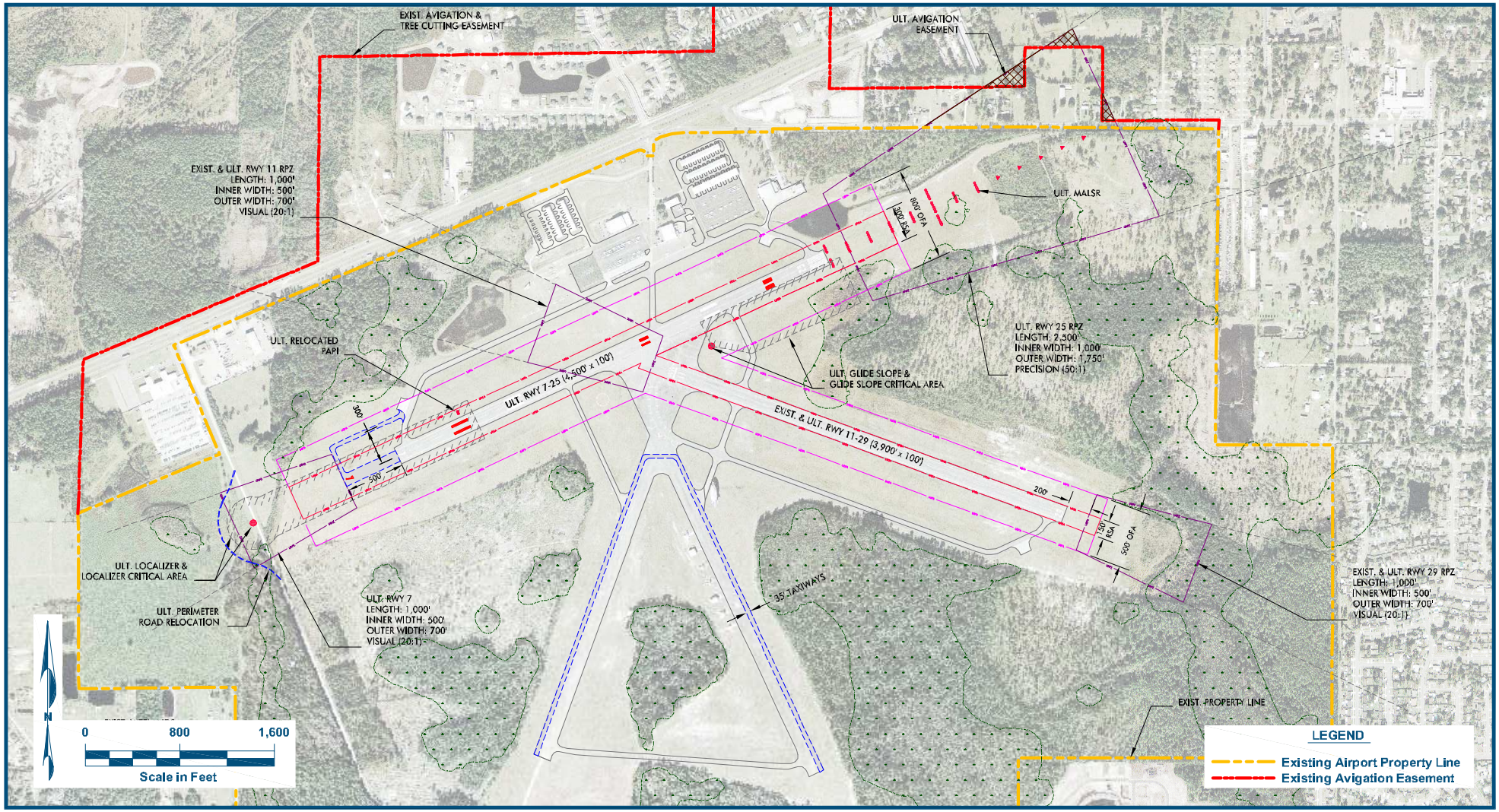

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Figure 5-2

A listing of key strengths and weaknesses associated with Airfield Concept 2 is listed below:

AIRFIELD CONCEPT 2
"RUNWAY EXTENSION" SCENARIO

Source: The LPA Group Incorporated, 2006

Strengths	Weaknesses
1. Provides required runway length of 4,500 feet 2. Accommodates aircraft design group C-II 3. Provides precision instrument approach capabilities on Runway 25, and non-precision approach to Runway 7 4. Provides full runway access thereby avoiding back taxiing issues 5. Anticipate increased airfield and runway capacity due to additional connector taxiway and precision approach capability. 6. Taxiway development provides for improved access to western quadrant of the airfield 7. All runways equipped with required NAVAIDs and markings 8. No anticipated environmental impacts	1. Requires the realignment of the airport perimeter road 2. Requires relocation of Runway 7 PAPIs & REILs 3. Does not eliminate use of grassy area for landings and takeoffs of ultra-lights and gliders. 4. Significant cost (~$17.2 million) 5. Requires the replacement of MIRL with HIRL on Runway 7-25 6. May require Environmental Assessment 7. Requires acquisition of avigation easement (1.7 acres)

Airfield Concept 3 (Unconstrained Development)

The third concept consists of extending Runway 7 by 500 feet and adding 250-foot stopways to both runway ends. According to **FAA Advisory Circular 150/5300-13, Change 10**, "a stopway is an area beyond the takeoff runway centered on the runway centerline, and designated by the airport owner for use in decelerating an airplane during an aborted takeoff. The stopway must be at least as wide as the runway and able to support an aircraft during an aborted takeoff without causing structural damage to the airplane". The length of the overrun/stopway must be able to accommodate the critical aircraft at maximum takeoff weight. Based upon requests by existing and potential users as well as the general public in addition to expected aircraft demand, runway stopways are warranted. Thus, as a result of changes to the forecast transient fleet at HEG, the proposed stopways will provide an additional margin of safety in case an aircraft 'overshoots' or 'undershoots' the runway as well as provide JAA greater

flexibility for future development. The use of stopways on both Runway 7 and 25 provides the following declared distance lengths as outlined in Appendix 14 of FAA Advisory Circular 150/5300-13.

AIRFIELD CONCEPT 3
DECLARED DISTANCE CALCULATIONS

Source: FAA AC 150/5300-13, Appendix 14 and The LPA Group, Inc. 2007

	Runway 25	Runway 7
Takeoff Run Available (TORA)	4,500	4,500
Takeoff Distance Available (TODA)	4,500	4,500
Accelerate Stop Distance Available (ASDA)	4,750	4,750
Landing Distance Available	4,500	4,500

In addition to the proposed runway extension, this concept also adds a parallel turf runway for light sport and glider aircraft.

Turf Runway

Currently, light sport aircraft and gliders land on turf situated between Taxiway A and Runway 7-25. This area, although not designated or marked for landing, may potentially cause unsafe conditions for aircraft on the runway or taxiway due to the limited separation distances between them. Hence, several sites were evaluated and considered for the ultimate layout of the turf runway as shown in **Figure 5-3**, *Turf Runway Alternatives*, but due to impacts on hangar facilities and existing wetlands as well as wind direction and flight patterns, the placement of the turf runway south of Runway 7-25 appeared to be the most legitimate and safest course of action without compromising approach areas. Additionally, impacts to airspace were also considered. Based upon discussions with Cecil Field and JAA airspace personnel, concerns regarding crossing an active runway during approach and departure were resolved with modified flight operations procedures. One suggestion noted was a left hand turn off of Runway 7 and a right hand turn off of 25. This would allow aircraft to operate well within Herlong's airspace and not impact operations on Runway 7-25. The proposed location for the turf runway will ultimately allow future expansion of facilities by providing parking and shade hangars while also limiting encroachment by larger aircraft.

Five potential alternatives, as shown in **Figure 5-3**, were developed for the new turf runway. Placing the turf runway parallel to the north side of Runway 7-25 was not considered an option due to its significant impact on both existing facilities and operations.

Alternative 1: Parallel to Runway 7-25 – This option, although convenient in terms of access from the

north side of the airfield, poses a potential problem for separation with aircraft operating on Runway 7-25. The proximity and density of aircraft activity in this area causes a problem for larger aircraft due to the concentrated light sport aircraft that will use the turf runway.

Alternative 2: Runway 7-25 South of Closed Runways - Alternative two does provide 95 percent wind coverage for a 10 knot crosswind. However, the location would impact residential development south and west of the airfield, impact recommended industrial development as well as impact the local Gun and Rifle Club. In addition, Alternative 2 is located within a wetland area. Therefore, significant mitigation and cost would be required to effectively accommodate these operations.

Alternative 3: Staggered and Parallel to Runway 7-25 – Similar to Alternative 1, this option suggests that the turf runway be situated parallel to 7-25 but shifted south and then to the southwest several hundred feet. This configuration establishes more separation with 7-25, allowing a better safety margin for both larger and smaller aircraft. However, a shifting of the turf runway to the southwest will encumber the location of the perimeter and ultimate south side access road.

Alternative 4: Parallel to west closed runway – This option enables flight activity by light sport aircraft to be completely segregated from larger aircraft activity on Runway 7-25. This configuration does not overlap the approach surfaces to Runway 7-25 and facilitates the operational pattern and activity of light aircraft. Another advantage of this alternative is the benefit of adjacency of the runway to a dedicated area exclusive to sport and light aircraft.

Alternative 5: Runway 9-22 - Alternative five would also separate powered aircraft traffic from the lighter glider and sport aircraft traffic, thus improving overall airport capacity. In addition, wind coverage for Runway 9-22 is almost 92% with a 10 knot crosswind. However, like Alternative Two, Alternative Five will require significant mitigation and, therefore, will incur a significant cost. Further, operations would require glider and other small aircraft to operate near the Gun and Rifle Club which may be considered a safety hazard.

Preferred Turf Runway Alternative - It is recommended that a 2,000 by 60-foot Turf Runway be constructed 400 feet parallel to and staggered adjacent to Runway 7-25 to segregate ultra light and glider traffic from the piston and turbine aircraft that use Runway 7-25. Due to environmental and terrain constraints anticipated to occur at the 700 foot runway to runway separation, JAA requests a modification to design standards. Further, HEG management and JAA will implement operating procedures designating that the paved Runway 7-25 and Turf Runway (7U-25U) are considered one runway. Thus, simultaneous operations are not allowed. An area adjacent to the turf runway will be graded for glider and sport aircraft storage.

In conjunction with the runway extension, a 500 foot extension is recommended for Taxiway A to provide access to the new runway threshold. The runway-to-taxiway separation between Runway 7-25 and Taxiway A will remain at 300 feet and its width will be 35 feet in accordance with AC 150/5300-13. In addition, it is recommended that the closed runways be converted to 35 foot wide taxiways, in accordance with Aircraft Group II requirements, thereby providing access to the southern quadrant of the airfield. Further, the removal of excess pavement will minimize the airport's ongoing pavement maintenance costs. Again, the cost of an environmental assessment related to the extension of Runway 7-25 was included in the preliminary cost estimates. Although based upon a preliminary environmental evaluation that potential impacts will be minimal, and, therefore unlikely to trigger an EA, it was considered in the best interest of JAA to include this cost since the decision to require an EA or Categorical Exclusion is determined by the FAA.

As discussed in Airfield Concept 2, a precision instrument approach to Runway 25 is recommended as is a precision instrument approach to Runway 7 either using an ILS or LPV approach. This will allow an approach visibility of less than 3/4 statute mile to either runway threshold. Both the ILS and LPV will require approach lighting systems and upgrades to Runway 7-25's runway markings and lighting. Further an airspace study would need to be conducted by the FAA prior to implementing a Category I precision instrument approach to Runway 7 in order to determine if such operations will impact approaches to Runways 18L-36R and 18R-36L at Cecil Field Airport. As shown in Alternative 2, the PAPIs and REILs on Runway 7 will be relocated to the new threshold, and a realignment of the airport perimeter road is required. **Figure 5-4** is a graphical representation of Airfield Concept 3.

Costs associated with Concept 3 include the acquisition of avigation easements beyond the Runway 7 and Runway 25 thresholds. Property acquisition is estimated at 10.7 acres (1.7 acres Runway 25 and 9.0 acres Runway 7). Property prior to the Runway 7 threshold is designated as commercial/industrial. Land acquisition, based upon the COJ Property Appraiser information, is anticipated to impact only two at a maximum three businesses. Property prior to the Runway 25 threshold consists of a mix of residential and commercial land use. It is anticipated that the acquisition of additional land associated with the proposed avigation easement will impact approximately three (3) home owners and one or two businesses. However, since JAA already has a partial avigation easement over the residential property located across Normandy Blvd, it is anticipated that the impact to both homeowners and businesses will be negligible. Still an environmental assessment may be required to determine the impact of proposed development.

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Turf Runway Alternatives

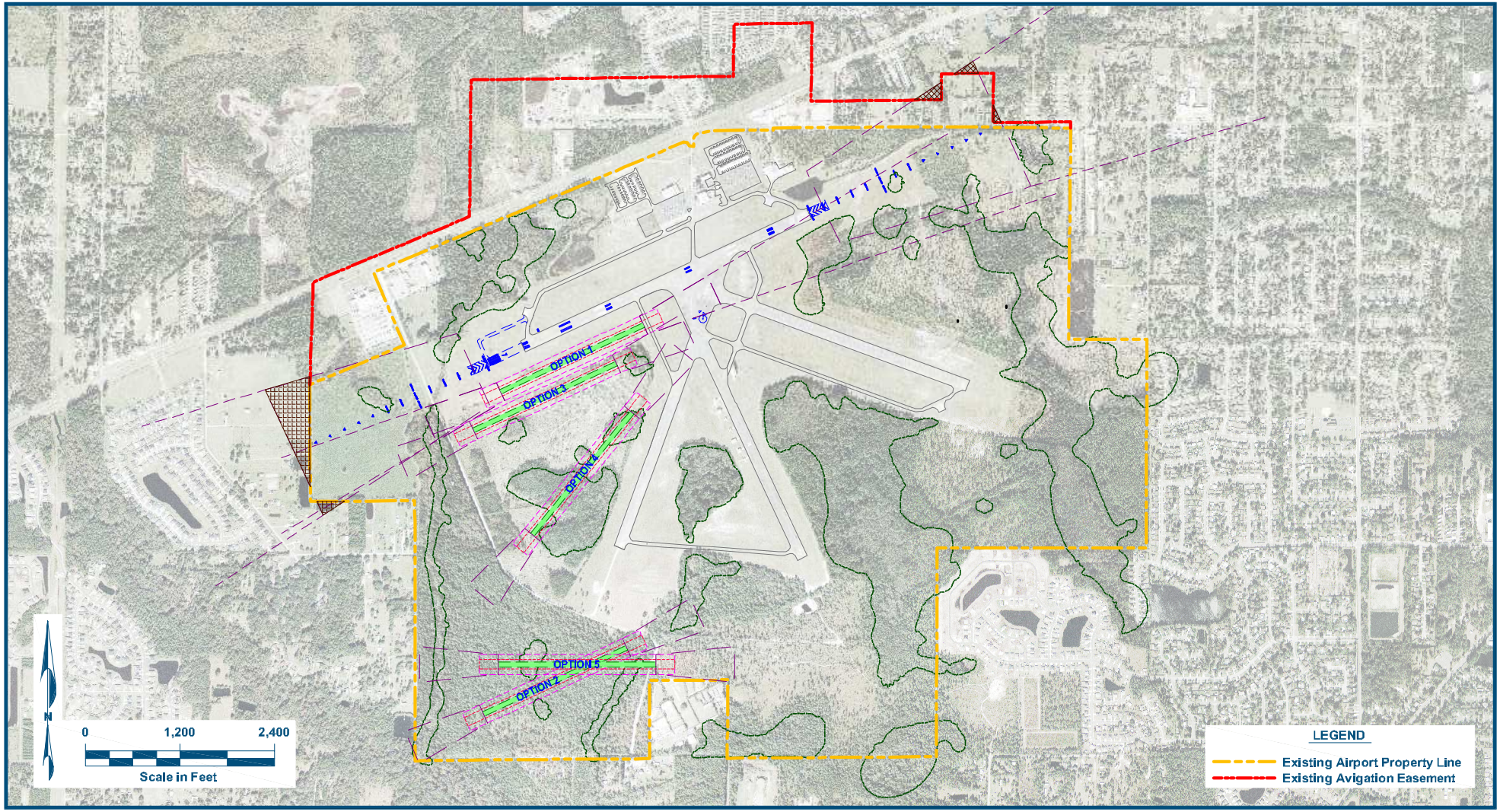

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Figure 5-3

A listing of key strengths and weaknesses associated with Airfield Concept 3 are listed below:

CONCEPT 3
"RUNWAY EXTENSION WITH STOPWAYS" SCENARIO

Source: The LPA Group Incorporated, 2006

Strengths	Weaknesses
1. Provides required runway length of 4,500 feet and an additional 500 feet for aircraft overruns 2. Provides option for 600 ft runway extension to avoid lighting relocation as well as 400 feet for aircraft overruns. 3. Accommodates user and public demand for longer runway and stopways in case of aircraft aborted takeoff. 4. Provides JAA flexibility for development based upon runway lighting needs 5. Accommodates aircraft design group C-II 6. Provides precision instrument approach capabilities on both Runways 25 and 7 7. Provides full runway access thereby avoiding back taxiing issues 8. Anticipate increased airfield and runway capacity due to additional connector taxiway and precision approach capability. 9. Taxiway development provides for improved access to western quadrant of the airfield 10. All runways equipped with required NAVAIDs and markings 11. Segregates powered and non-powered traffic	1. Requires the realignment of the airport perimeter road 2. May require an Environmental Assessment 3. Requires relocation of Runway 7 PAPIs and REILs 4. Significant cost (~$21.1 million) 5. Requires the replacement of MIRL with HIRL on Runway 7-25 6. Requires the installation of utilities on the south side of airfield to accommodate taxiway lighting 7. Requires acquisition of avigation easements

JACKSONVILLE AVIATION AUTHORITY

Airfield Concept 3

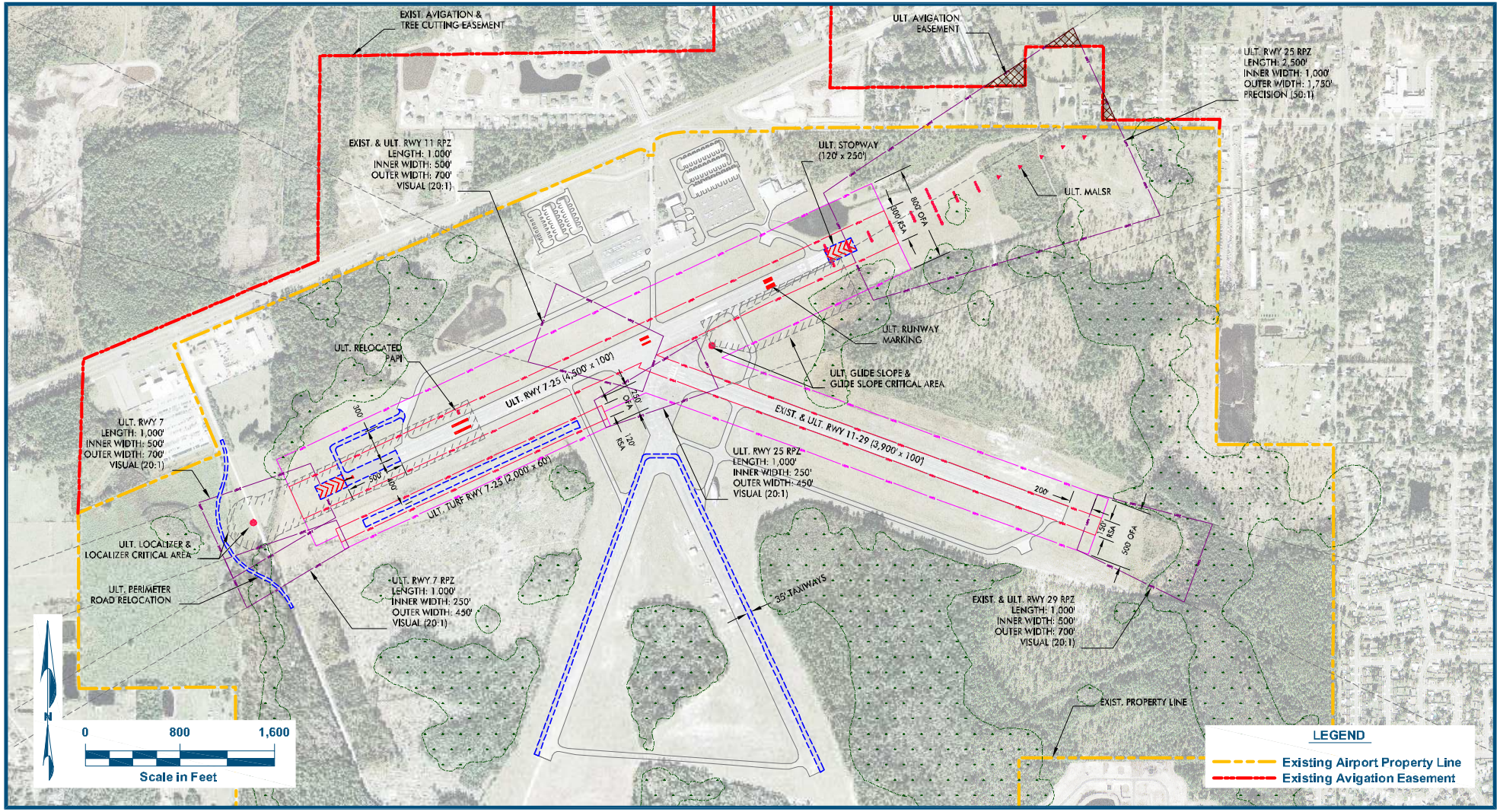

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Figure 5-4

Tables 5-8 and **5-9** outline the preliminary order of magnitude costs associated with Airfield Concept 3 in 2006 dollars. The total estimated cost of Airfield Concept 3 including routine maintenance and associated projects was determined to be approximately **$21,123,382**.

TABLE 5-8
AIRFIELD COSTS ASSOCIATED WITH ALL THREE CONCEPTS
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost
Runway 11-29 Pavement Overlay and Rehabilitation	$2,215,388
Runway 11-29 Marking Removal and Remarking	$297,317
Closed Runways Pavement Removal	$275,974
Taxiway Overlay and Repair (closed runways)	$1,151,009
Install Marking and Lighting on South Taxiways (Closed Runways)	$368,522
Pavement Condition Report	$30,000
Electrical Vault Relocation	$330,240
Design and Construct New Fuel Farm (2 Tanks)	$500,000
Replace AWOS	$200,000
Overlay Taxiways C & D	$1,700,000
Estimated Development Cost[1]	**$7,068,450**

[1] Project Costs include 20% engineering, design and contingency fee

Source: The LPA Group, Incorporated

TABLE 5-9
AIRFIELD CONCEPT 3 "RUNWAY EXTENSION WITH STOPWAYS"
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES
IN 2006 DOLLARS

Project Description	Estimated Cost
Environmental Assessment -Turf Runway	$50,800
Environmental Assessment - Runway 7 Extension	$200,000
Signage Plan	$29,000
Airfield Sign System Upgrades including new signage	$219,812
Rehabilitate Runway 7-25 - Phase I	$141,641
Rehabilitate and overlay Runway 7-25 - Phase II	$2,464,611
Runway 7 Extension	$719,528
Runway 7-25 Stopways and Markings	$618,352
Taxiway A Extension with Lights	$535,395
Taxiway A Rehabilitation and Overlay	$1,305,000
Taxiway A remove markings and remark	$219,124
Construct 2000 x 60 Turf Runway	$422,973
Relocate PAPI's on Runway 7	$32,211
Install REILs on Runway 7	$50,000
Runway 7-25 Marking Removal and Remarking	$342,591
Replace and relocate MIRL with HIRL on Runway 7-25	$288,482
Construct Taxiway J	$325,000
Construct Taxiway E	$350,000
Acquire Runway 25 Avigation Easement (1.7 Acres)	$60,000
Acquire Runway 7 Avigation Easement (9 Acres)	$270,000
Installation of ILS System on Runway 25 (Glideslope, Localizer and MALSR)	$1,950,000
Installation of ILS System on Runway 7	$1,950,000
Clear Runway 25 obstructions	$82,000
Clear Runway 7 obstructions	$82,000
Drainage Improvements *	$450,000
Realignment of perimeter road	$896,412
Estimated Development Cost[1]	**$14,054,932**

[1] *Project Costs include 20% engineering and contingency fee*
Source: The LPA Group, Incorporated, 2006

Environmental Assessment

Typically an environmental assessment (EA) is warranted, according to **FAA Order 5050.4B**, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions, and **Order 1050.1E**, Environmental Impacts: Policies and Procedures, for the following projects:

- Helicopter Facilities and operations
- Land Acquisition
- New Airport
- Airport Relocation
- New Runway
- Major runway strengthening or extension
- Conversion of Prime and Unique Farmland,
- Conversion or impacts to Coastal Waters or Wetlands, and
- Other actions anticipated to negatively alter existing airport environs.

Although the cost of an environmental assessment is included within the proposed airfield development concepts, based upon preliminary environmental impacts and limited discussions with FAA Environmental Scientists, the extension of Runway 7-25 and the construction of the turf runway are not anticipated to trigger an EA. However, the decision to apply a Categorical Exclusion or an Environmental Assessment is at the discretion of the FAA Airport District Office.

Evaluation of Concepts

The airfield concepts were evaluated within this section to weigh the inherent strengths and weaknesses of each in comparison to the other development concepts discussed. Concepts were evaluated within the following categories: best planning tenets, phasing/construction, operational performance, environmental impacts, fiscal factors and community recommendations and acceptance.

- Best Planning Tenets – pertains to the total growth potential that each concept affords and the process inherent to achieving that growth. The evaluation criteria associated with this category includes: the ability to provide airfield facilities that will satisfy the needs of unconstrained levels of demand, provides the best practices for safety and security, conforms to applicable FAA design and other appropriate standards, provides the highest and best on and off-airport land use, provides balance between elements, provides flexibility to adjust to unforeseen changes, conforms to appropriate local, regional and state transportation plans, is technically feasible, socially and politically feasible and satisfies users needs throughout the twenty-year planning

period.

- Phasing/Construction – pertains to existing on-airport land uses and associated impacts to existing facilities as well as the level of difficulty and the cost involved in implementing the proposed airfield concepts. The evaluation criteria associated with this category include the ability to phase construction and expand incrementally, the costs associated with construction, the impact on existing facilities, and any engineering difficulties associated with airfield build-out requirements.

- Operational Performance – compares the overall operational efficiency of the proposed airfield layouts. The evaluation criteria associated with this category include the compatibility with the long-range airfield in terms of length requirements and the efficiency of the supporting taxiway system.

- Environmental Effects – performs a general assessment to determine the degree to which proposed airfield improvements would potentially affect various components of the surrounding environment as outlined in FAA Order 1050.1, Environmental Impacts: Policies and Procedures and FAA Order 5050.4, FAA guidance for complying with NEPA.

- Fiscal Factors – performs an order of magnitude cost analysis to determine if concepts are responsive to the fiscal constraints of the Airport. This includes an evaluation of the respective cost advantages and disadvantages of the concepts as well as identification of likely funding sources to determine if the proposed concepts are realistically within the fiscal capability of the Airport.

- Community Recommendations/Acceptance – performs a general assessment of the likelihood that the proposed improvements will obtain acceptance from the community at large.

An evaluation matrix, which addresses the aforementioned criteria, is presented in **Table 5-10**, *Airfield Concept Evaluation*.

Recommended Airfield Concept

Upon evaluation of the criteria presented in **Table 5-10** as well as consultation and input from the TAC and general public, the recommended airfield concept for HEG is Airfield Concept III, "Runway Extension with Stopways Scenario". The evaluation scores presented in **Table 5-10** afford a measurable assessment of the three airfield alternative concepts with respect to the outlined criteria. Although

Alternative I is most favorable in terms of phasing and construction, it fails to address the needs and accommodate forecast increases in operational activity at HEG. Although a 500-foot extension is required to accommodate forecast activity, a 600-foot extension with 400 feet of stopways may be more cost effective. The anticipated cost of relocating the lights on Runway 7-25 to accommodate the 500-foot extension may outweigh the cost of doing a 600-foot extension which will require additional lighting only. As a result, Airfield Concept III provides the opportunity to implement either extension, reinforces the needs of all airport constituencies, and provides the most reasonable development scenario for the airport's immediate and long-term requirements and its greater role within the Jacksonville Airport System. As a result, based upon the previous analysis, it is recommended that Airfield Concept III be considered for future implementation. **Figure 5-5** is a graphical representation of the preferred airfield development.

TABLE 5-10
AIRFIELD CONCEPT EVALUATION

Evaluation Criterion	Airfield Concept 1		Airfield Concept 2		Airfield Concept 3	
	Score	Comment	Score	Comment	Score	Comment
Legend: 1. Poor 2. Fair 3. Satisfactory 4. Very Good 5. Excellent						
Best Planning Tenets:						
Accommodates unconstrained demand	1	Will not accommodate larger aircraft	4	Will accommodate larger aircraft	5	Will accommodate larger aircraft and provide additional safety margin. Provides JAA greater level of flexibility for future development
Conforms to best practices for safety and security	2	Does not provide runway length required to meet demand	4	Provides runway length required to meet majority of aircraft	4	Provides runway length required to meet majority of aircraft
Provides highest and best land use	1	Maintains status quo	5	Allows for additional on-airport development	5	Allows for additional on-airport development
Meets forecast growth	1	Does not meet forecast growth	5	Meets forecast growth	5	Meets forecast growth
Provides growth beyond planning horizon	1	Doesn't meet anticipated critical aircraft requirement	4	May accommodate demand, but does not offer as much flexibility	5	Allows airport greater flexibility in accommodating demand
Improves airfield capacity	1	Capacity limited	4	ILS improves capacity	5	Turf runway and ILS/ Precision approach

						improve capacity
Provides flexibility	1	Limited flexibility	4	Runway and Taxiway extensions combined with ILS	5	Most flexible due to Turf runway
Conforms to Sponsor's vision	1	Does not meet sponsors desire for growth	4	Accommodates sponsor desire for ILS and runway extension	5	Meets sponsors needs beyond planning period
Conforms to applicable transportation plans	3	Does not conform with vision of HEG within the JAA System	5	Conforms with JAA Management Vision	5	Same as Two

TABLE 5-10
AIRFIELD CONCEPT EVALUATION (CON'T)

Evaluation Criterion		Airfield Concept 1		Airfield Concept 2		Airfield Concept 3
	Score	Comment	Score	Comment	Score	Comment
Legend: 1. Poor 2. Fair 3. Satisfactory 4. Very Good 5. Excellent						
Technically feasible	5		5		5	
Socially and politically feasible	5	No Change, thus considered feasible	4	Will require support to implement	4	Will require support to implement
Satisfies users needs	1	Does not satisfy user needs	4	Satisfies traditional users (i.e. Piston and turbine operations)	5	Satisfies all user needs
Phasing/Construction:						
Ability to phase construction/ expansion	5	No Development	5	Construction phasing based upon demand	5	Phasing based upon demand as well interest beyond forecast
Impact on existing facilities	5	No Impact on existing facilities other than refurbish closed runways	4	Limited impact associated with construction	4	Same as Two
Engineering/ Land Build-out or acquisition requirements	5	No land acquisition required.	4	Requires acquisition of 1.7 acres for avigation easement	4	Requires 10.7 acres for avigation easement
Operational Performance:						
Capacity	1	Limited improvements impact overall capacity	4	Improves overall capacity and accommodates planned demand	5	Improves overall capacity and accommodates beyond planned demand
Capability	3	Capability limited due to runway length	4	Accommodates design aircraft and precision approach	4	Accommodates design aircraft & precision approach on both Runways 7 and 25. Precision approach to Runway 7 must be coordinated with FAA to determine impacts on

						surrounding airfields
Efficiency	3	Development limited	4	Improves airfield capacity	5	Improves airfield capacity

TABLE 5-10
AIRFIELD CONCEPT EVALUATION (CON'T)

Evaluation Criterion		Airfield Concept 1		Airfield Concept 2		Airfield Concept 3
	Score	Comment	Score	Comment	Score	Comment
Legend: 1. Poor 2. Fair 3. Satisfactory 4. Very Good 5. Excellent						
Environmental Effects:						
Noise	5	No Change	5	Contours remain on airport	5	60, 65 and 70 DNL Contours remain on airport
Land Use	5	No Change	5	Avigation Easement Acquistion prior to Runway 25	5	Acquisition of two avigation easements associated with Runway 7 and 25
Social Impacts	5	No Change	5	May impact three residences and possibly two businesses within easement	5	May impact residences and businesses located within easements
Induced Socio-Economic Impacts	5	No Change	5	No Impact	5	No Impact
Air Quality	5	No Change	5	No Impact	5	No Impact
Water Quality	5	No Change	5	No Impact	5	No Impact
DOT Act, Section 303 (c)	5	No Change	5	No Impact	5	No Impact
Historical, Architectural, Archaeological, and Cultural Resources	5	No Change	5	No Impact	5	No Impact
Biotic Communities	5	No Change	5	No Impact	5	No Impact
Air Quality	5	No Change	5	No Impact	5	No Impact
Water Quality	5	No Change	5	No Impact	5	No Impact

TABLE 5-10
AIRFIELD CONCEPT EVALUATION (CON'T)

Evaluation Criterion		Airfield Concept 1		Airfield Concept 2		Airfield Concept 3
	Score	Comment	Score	Comment	Score	Comment
Legend: 1. Poor 2. Fair 3. Satisfactory 4. Very Good 5. Excellent						
DOT Act, Section 303 (c)	5	No Impact	5	No Impact	5	No Impact
Endangered and Threatened Species	5	No Impact	5	No Impact	5	No Impact
Wetlands	5	No Impact	5	No Impact	5	No Impact
Floodplains	5	No Impact	5	No Impact	5	No Impact
Coastal Zone Management	5	No Impact	5	No Impact	5	No Impact
Coastal Barriers	5	No Impact	5	No Impact	5	No Impact
Wild and Scenic Rivers	5	No Impact	5	No Impact	5	No Impact
Farmland	5	No Impact	5	No Impact	5	No Impact
Energy Supply and Natural Resources	5	No Impact	5	No Impact	5	No Impact
Light Emissions	5	No Impact	5	No Impact	5	No Impact
Solid Waste Impact	5	No Impact	5	No Impact	5	No Impact
Construction Impacts	4	Limited impact associated with maintenance and closed runway conversion	3	Impacts associated with Runway and Taxiway development	3	Same as Two

TABLE 5-10
AIRFIELD CONCEPT EVALUATION (CON'T)

Evaluation Criterion		Airfield Concept 1		Airfield Concept 2		Airfield Concept 3
	Score	Comment	Score	Comment	Score	Comment
Legend: 1. Poor 2. Fair 3. Satisfactory 4. Very Good 5. Excellent						
Fiscal Factors:						
Cost Estimates	5	$9.2 million	3	$16.5 million	2	$20.2 million
Key Elements		* Rehabilitation of Rwys 7-25 & 11-29 * Conversion of Closed Runways to Taxiways * Relocation of electrical vault, NDB and wind cone * Airfield Signage Upgrade * New Fuel Farm * Drainage Improvements * Overlay of Twys C & D		* All Projects in Airfield Concept 1, and * Runway 7-25 extension * NPI Approach to Runway 25 * Upgrade MIRL to HIRL on Runway 7-25 * Construct Taxiway J * Extension and Overlay of Taxiway A * EA * Acquisition of Avigation Easement - Rwy 25 Installation of REILs and Relocation of PAPIs - Runway 7 * Realign perimeter road		*In addition to items outlined in Airfield Concept 2: * Runway extension with 500 feet stopways * Turf Runway Construction * Taxiway E extension * NPI on Runway 7 * Avigation Easement acquisition - Rwy 7

TABLE 5-10
AIRFIELD CONCEPT EVALUATION (CON'T)

Evaluation Criterion		Airfield Concept 1		Airfield Concept 2		Airfield Concept 3
	Score	Comment	Score	Comment	Score	Comment
Legend: 1. Poor 2. Fair 3. Satisfactory 4. Very Good 5. Excellent						
Fiscal Capability of Airport	2	Costs limited to reuse/redevelopment of closed runways		Cost significant due to installation of precision approach and runway extension		Will need cost benefit analysis to justify stopways and turf runway
Community Recommendations/Acceptance						
Public Acceptance	5	Limited development, thus, expect public acceptance	5	Based upon meetings with users and public, runway extension requested	5	Public & Users requested extension and stopways for increased safety due to changes in fleet mix as well as weather.
Total Evaluation Score	150		192		198	
Average Evaluation Score	4.5		5.8		6.0	

Source: The LPA Group Incorporated, 2006

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Preferred Airfield Concept

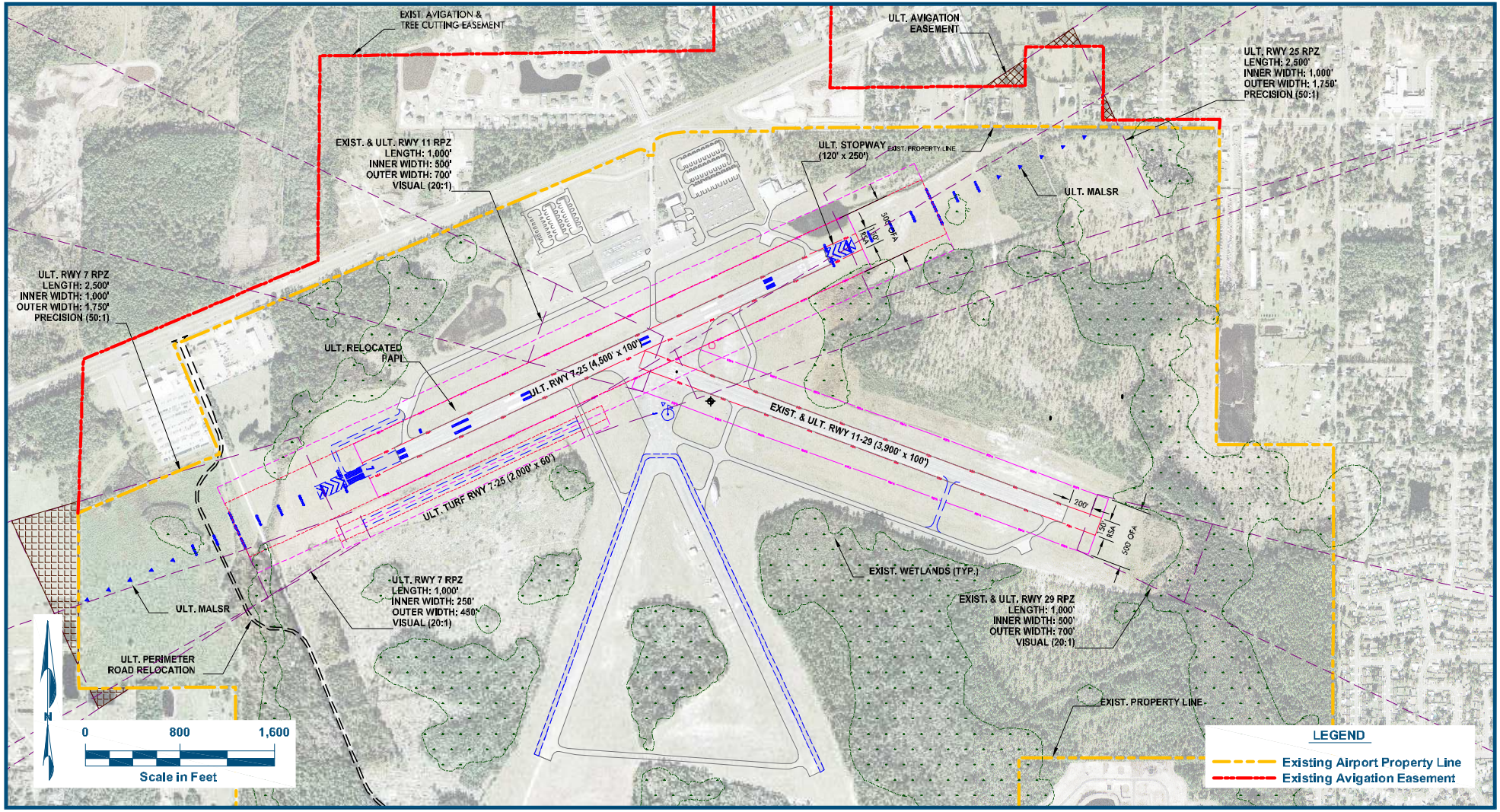

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Figure 5-5

Land Use

The objective of the Land Use Analysis is to evaluate the impacts that airfield and landside improvements would have on the use of land within the Airport's boundary, on contiguous parcels and on the community as a whole. As described in **Chapter 2**, *Airport Inventory*, HEG is located on approximately 1,434 acres of land which is designated as Fee Simple ownership.

While considering the inter-relationship between various airport functions, the recommended concept identifies and delineates the areas on the Airport reserved for future development. Land use concepts were developed based upon Airfield Concepts 2 and 3, which primarily involve the extension of Runway 7, the rehabilitation of the closed runways as well as the installation of an ILS approach to Runway 25. However, Airfield Concept 3 in addition to the development outlined in Airfield Concept 2 also includes development of a Turf Runway and 250 foot safety stopways beyond the thresholds of both Runways 7 and 25. Both concepts will accommodate anticipated demand over the course of the twenty year planning period.

It is important to note that discussions are on-going as to the use of the property on the south portion of the airfield for potential residential development. Due to FAA concerns related to on-airport residential development, JAA is considering the implications would consider divesting itself of the property with the assistance of the FAA. However, in a letter received on May 11, 2006, included in **Appendix B**, *FAA/FDOT Correspondence and Related Data*, of this report, "the FAA strongly discourages "through the fence" operations' especially those including residential land use." The FAA further stated: "If an airport sponsor chooses to grant "through the fence" access, the sponsor must ensure that its decision will not result in a violation of its Federal obligations, at present or in the future."

However, according to the Land Use Compatibility and Airport documentation developed by the FAA in 1998, HEG can support a wide variety of discretionary uses including: airport or aviation related businesses, non-aviation commercial/industrial development, general aviation and corporate aviation development, mixed use, which includes aviation and non-aviation development, as well as low population density, such as golf courses, limited agricultural, etc. within the approach/transition zones. **Figure 5-6** is a graphical representation of the Recommended Land Use Map for HEG. These areas serve as the foundation for future airport development and are described in the paragraphs that follow.

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Land Use Map

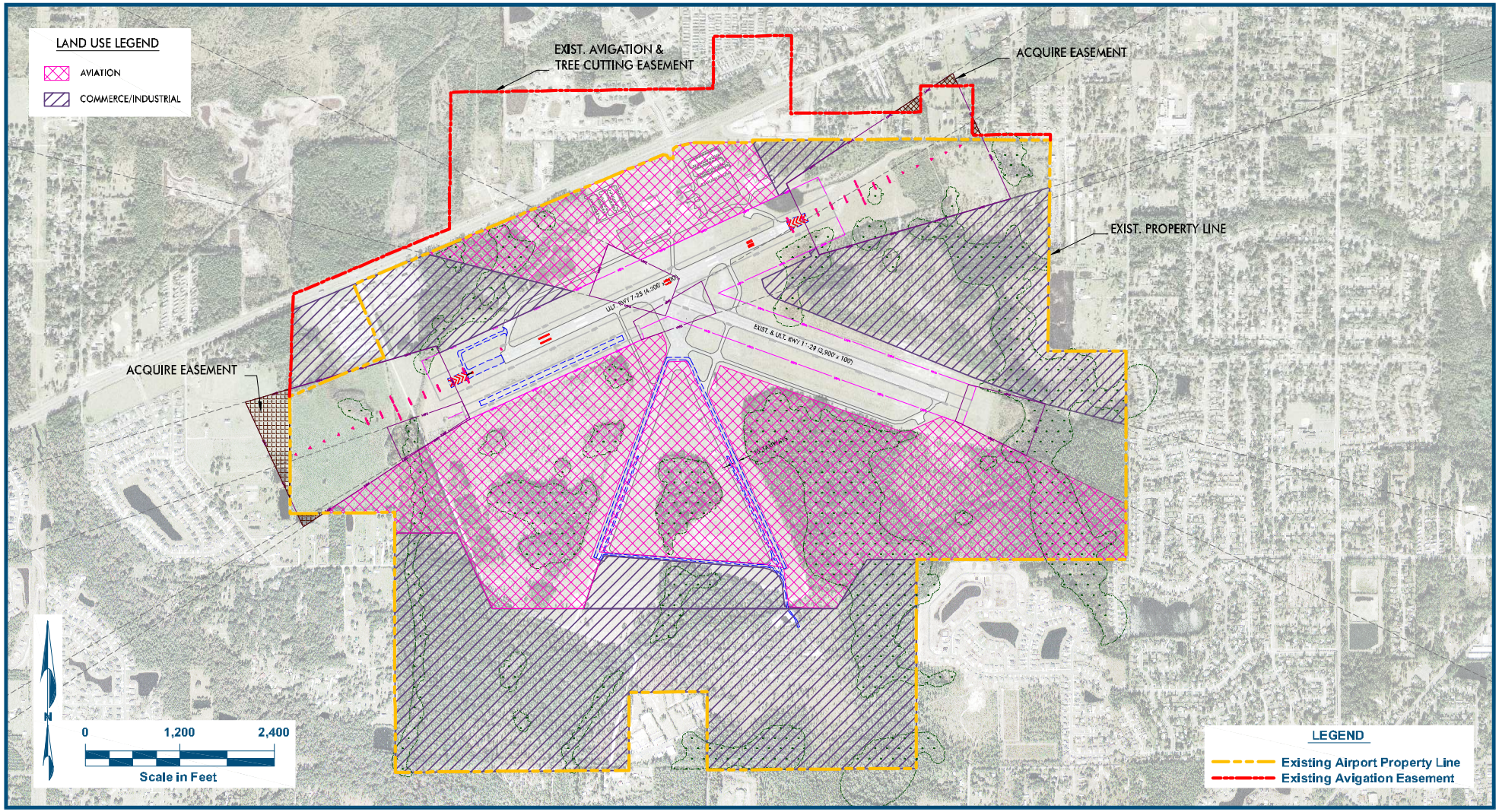

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Figure 5-6

Airport Operations

The airport operations area is centered on the runways, taxiways, and various safety zones (i.e. Runway Safety Area (RSA), Runway Object Free Area (OFA), Runway Protection Zone (RPZ), etc.) that impact the operation of aircraft. Based upon the airfield concepts discussed, an extension to Runway 7-25 as well as the installation of a precision approach to both Runways 25 and 7 will require the acquisition of approximately 15.7 acres north of the threshold of Runway 25 and 9.9 acres north and west of the threshold to Runway 7 to accommodate the expanded RPZ areas.

It is anticipated that a runway extension would result in increased in turbine GA activity and would no longer limit aircraft performance requirements due to inadequate facilities, thus making the Airport more attractive to a variety of users. Although a slight increase in noise is possible due to increases in turbine operations, based upon the noise contours, the noise increase was negligible since newer turbine engine aircraft are quieter than several older piston aircraft currently using the field. Existing and future noise contours associated with the existing and forecast fleet mix is provided in **Appendix D**, *Noise Analysis*, of this report.

The establishment of future airport development along the northwest, southwest and southeast portions of the airfield will maximize the utilization of available land areas while also providing a buffer between airport operations and contiguous residential and commercial parcels while increasing the airport's overall revenue stream. Further, proposed taxiway development through the conversion of the closed runways to taxiways will provide airside access to currently underutilized areas of the airport, thus improving airfield capacity and utilization.

Corporate and Light General Aviation

As mentioned, the areas south of Runway 7-25 adjacent to the closed runways is underutilized due to limited surface access, poor pavement conditions, and lack of utilities. To date, the majority of general aviation and corporate facilities are located along the north side of the Airport property line adjacent to Runway 7-25 and Normandy Boulevard. As part of proposed airfield development, it is recommended that facilities dedicated to larger corporate aircraft be located adjacent to the closed runways along the south and west side of the airport property. Development of this area would include corporate and conventional hangars as well as associated apron and parking facilities.

Areas dedicated to ultra lights and gliders could be located adjacent to the proposed turf runway, 7U-25U, thereby providing ease of access while limiting potential conflicts with traditional piston and turbine aircraft on the field. Lastly an area dedicated to lighter GA development such as T-hangars,

small conventional hangars and FBO facilities would be constructed to the north of Runway 7-25. The General Aviation areas can be easily accessed via Normandy Boulevard and the Airport Entrance road, while access to the west and south side of the airfield could be obtained via the airport perimeter road and access gate south of the Airport Entrance Road. It is important to note that for development to occur, utilities will need to be provided before construction can begin.

Airport Commerce and Industrial Park

In an effort to increase the generation and diversification of revenues at HEG, several areas of the airport were evaluated for airport commerce or industrial park development. Possible locations include the western side of the airport along Normandy Boulevard contiguous to the road and near the Advanced Disposal site, along the eastern side of the airport located between Runways 25 and 29, and the land area south of the closed runways adjacent to the Airport Perimeter Road as shown in **Figure 5-6, Land Use**. Commerce and industrial park development will play a key role in providing a location for aviation and non-aviation oriented businesses, including non-aviation storage facilities, offices and even a restaurant.

A Commerce Park/Industrial Park may also provide a location for firms such as parts suppliers and avionics repair shops that often operate from locations not directly accessible to the airfield to be accommodated. There are a number of organizations and businesses that prefer to be located on or adjacent to an airport due to the orientation of their products, market and/or operations. These may include a number of firms that operate their own aircraft.

JAA should also consider marketing HEG's facilities to corporate aircraft and experimental aircraft manufacturers. Typically these companies locate in areas with a strong aviation-oriented labor force. In developing the site, an area must be chosen which provides ample apron frontage and easy surface access. Manufacturers of specialized parts or components do not require direct access to the airfield but many, due to the aviation orientation of their business, would make the airport a preferred location.

Both a Commerce Park and Industrial Park are compatible with the airport environment, and not only provide airport management an additional source of revenue but supply a buffer between the airport operating area and the surrounding community.

Residential Development

Several interested parties have approached JAA to develop a residential fly-in community either on or adjacent to airport property south of the closed runways. A potential layout of the fly-in community include lots with houses and attached hangars as well as taxi lanes providing access to the airfield through the conversion of the closed runways to taxi lanes as shown in **Figure 5-7**, *Residential Air Park*. It is the current FAA policy not to support residential fly-in community development around public use airports even if the airport secures covenants and restrictions on the property that ensure the airport will be protected from noise and height control issues. The FAA is also concerned about the potential for through the fence operations that might occur as shown in the letter dated May 11, 2006 in **Appendix B** of this document. If JAA wants to pursue this alternative, they most probably have to seek legislative support to address FAA concerns.

JAA could also declare the property not required for aviation purposes and seek FAA approval to sell the property at fair market value. The money obtained from the sale of property could be used for future airport development. Based upon local appraisals, it is estimated that the sale would generate (at $20,000 per acre) approximately $2.4 million to offset airport costs listed in **Table 5-11** needed to support residential development. Anticipated airport development needed to accommodate a residential fly-in community is related primarily to fence line, roadway and taxiway improvements. However, the airport may gain significant revenues associated with aircraft maintenance and fuel sales.

TABLE 5-11
RESIDENTIAL FLY-IN COMMUNITY
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost
Preliminary Development	$300,000
Taxilane extension	$1,200,000
Fence line Relocation including security improvements	$2,000,000
Perimeter Roadway Relocation	$500,000
Total Development Costs[1]	**$4,000,000**

[1] *Project Costs include 20% engineering and contingency fee*

Source: The LPA Group, Incorporated

RESIDENTIAL DEVELOPMENT SOUTH SIDE CONCEPT 2 *Source: The LPA Group, Incorporated 2006*	
Strengths	**Weaknesses**
1. Sale of land will provide airport with influx of cash for on-airport improvements 2. Residents will support on-airport facilities, including aircraft maintenance and fuel sales	1. Requires the sale of property thus decreasing HEG's available property 2. Will require relocation of Airport fence line 3. Will require relocation of Airport Perimeter Road 4. Requires through the fence operation, therefore airport will be required to install additional gates 5. FAA does not approve of "through the fence" operations

Another issue that will need to be addressed in order to move forward with possible residential development is the issue of the gun club located to the south of HEG property adjacent this proposed development.

Mixed Use

While HEG should give priority consideration in its real estate policy to firms and organizations that are aviation oriented, it should not preclude using available property to attract other industrial/commercial activities. Creating strong business activities near the Airport will create beneficial effects and a favorable climate for the potential attraction of aviation-related organizations.

Thus, in order to maintain flexibility and take advantage of market opportunities, areas adjacent to Normandy Boulevard and Herlong Road on the north and east sides of the airfield can and should be reserved for mixed use development. As a result, this combination of aviation and non-aviation development including commercial, industrial, or retail opportunities depending upon market demand, would allow HEG to maximize land use within its current property line while providing an additional source of viable revenue.

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Residential Air Park

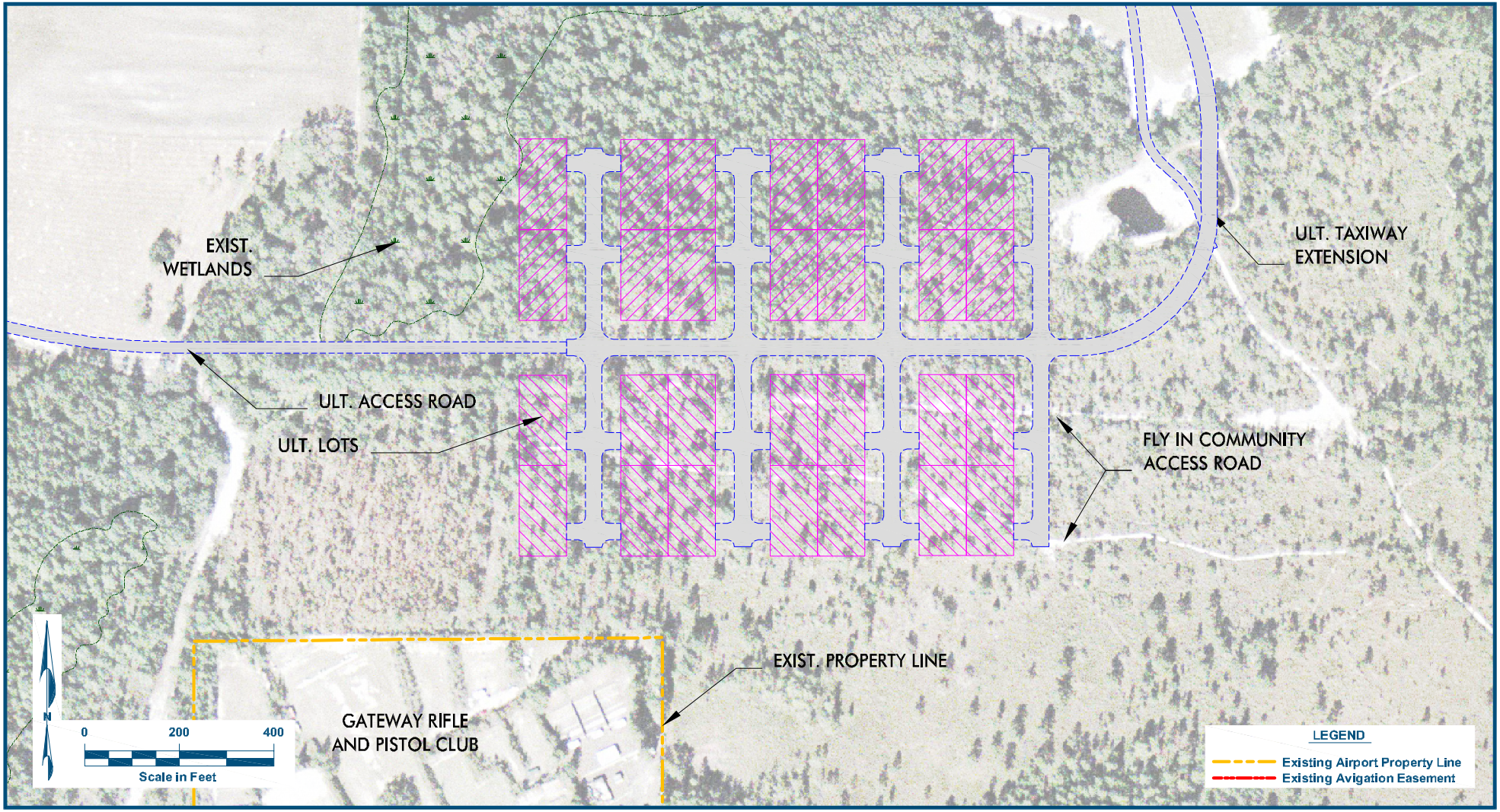

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Figure 5-7

Low Density Uses for Approach/Transition Zones

The approach/transition zones for Runway 7, 25 and 29 are unsuitable for most commercial and industrial development due to height limitations and/or obstacle free zone criterion. This area is often designated for low density population use. Many airports have been successful in developing low-density recreational facilities in approach and departure zones. Golf courses are frequently regarded as a good use in this area, although clubhouses and other areas where large groups of people congregate should not be located within the RPZ. Ball fields may be developed outside the RPZ, but caution must be exercised when planning. Caution should also be exercised before planning recreational facilities, even on an interim basis, in areas reserved for future aeronautical development. The required relocation of such facilities may require special environmental approvals.

When considering potential land uses within high noise zones, consideration must also be given to the land use guidelines included within the Airport's approved Noise Compatibility Program, which specifies the level of noise reduction which should be included in structures, local zoning and general compatibility of various types of land uses.

LANDSIDE FACILITIES – BUILDING AREAS

All landside facilities, particularly building areas, are ideally developed to be in balance with the airfield/airspace facilities. At HEG, existing and proposed development areas include:

- GA and related aeronautical development areas
- Commerce Park
- Industrial Park
- Residential Aviation Development

The focus of this section is to evaluate those building areas directly related to support aviation activity. Non-aviation development on-Airport was evaluated in a cursory manner considering location, function and future utility and compatibility with aviation operations.

Building area concepts were conceptualized with the goal of creating a facilities plan that exhibits the following characteristics:

- Flexibility: A plan that is demand-responsive and can adjust over time to changes in quantifiable demands as well as changes in the nature of demand.
- Vision: A plan that addresses probable future aviation trends and technologies, as well as trends in other transportation arenas.
- Definition: A plan that sets a sure course of action for the short-range, and is clearly supported and realistic.
- Order: A plan that views each part of the landside system as a interrelated part of the whole Airport and regional transportation system
- Balance: A plan that can extend the landside to its required fullest extent while maintaining balance with the capacity of the fully expanded airside.
- Convenience: A plan that enables HEG and its tenants to achieve a high level of public service.
- Stability: A plan that properly guides small increments of growth and modification that HEG and its tenants may need over time.
- Economic Soundness: A plan that enables HEG and its tenants to prosper over the years.
- Suitability: A plan that meets the needs of the Airport's tenants and its users.

Table 5-12 presents a cursory summary of estimated building area facility requirements derived from the previous chapter. Although specific years were used to identify forecast levels of development, these years merely represent "triggers" which may or may not coincide with the year that will require the expansion or upgrade of major facilities at the Airport. These requirements were used as the basis for the formulation and evaluation of concept building area concepts. These requirements are based upon an analysis of facilities at HEG and comparisons with other similarly sized airports based upon future levels of projected demand.

TABLE 5-12
SUMMARY OF BUILDING AREA FACILITY REQUIREMENTS BASED UPON EXISTING OPERATIONAL CAPACITY/DEMAND

	Existing 2005	2010	2015	2025
Activity:				
Peak Hour Passengers	17	19	20	22
Aircraft operations				
General Aviation	63,101	66,958	70,828	79,251
Military Rotorcraft	2,240	2,000	2,000	2,000
Total operations	65,341	68,958	72,828	81,251
Based Aircraft	170	179	190	224
Requirements:				
GA Terminal Facilities				
Terminal building (sq ft)	2,000	1,455	1,544	1,723
Parking spaces adjacent to Terminal	5	32	33	37
Public Parking (SY) adjacent to Terminal	220	1,388	1,470	1,634
General Aviation Hangars Required:				
T-hangars	86*	102**	105	114
Conventional Hangars	2	3	3	4
Corporate Hangars	0	6	6	6
Shade Hangars or Other Facilities	0	6	8	15
Apron Space:				
Conventional Hangar Apron (SY)	29,000	37,888	37,888	40,110
Corporate Hangar Apron (SY)	0	3,333	3,333	6,666
Transient Aircraft Apron Requirements (SY)	3,100	1,800	2,160	2,520
Based Aircraft Apron Requirements (SY)	29,000	15,300	16,800	21,300

**Note: Existing T-Hangars includes recently constructed 14-Unit T-Hangar (T-6)*
***Note: Based upon existing work program, anticipate **100** existing T-Hangars by 2010.*
Source: The LPA Group Incorporated, 2006 and Airport Management

Although it appears that no additional apron space is required to accommodate based and transient aircraft parking demand, it is recommended that new apron areas dedicated to light aircraft activity as well as transient aircraft operations be developed near the north of Taxiway A, adjacent to the proposed turf runway and possibly near the closed runways due to the location, condition and access limitations of existing facilities.

Considering the seemingly endless range of possibilities for facility development, broad concepts were first developed in their long-range configuration to a limited extent of detail in order to understand their potential and reasonableness in relation to anticipated demand. These concepts were then narrowed according to their ability to meet the characteristics described above. As a result, the following landside development area concepts were considered.

GA and Related Aeronautical Development Areas

The existing GA facilities are primarily located on the west side of the airfield adjacent to Normandy Boulevard. Yet, due to limited developable land within the western quadrant of the airfield, additional general aviation development is recommended within the midfield area east of Runway 7 and adjacent to the closed runway facilities. Expansion of facilities located west of Taxiway A and adjacent to the existing Terminal Facilities will be designated as the North GA complex whereas proposed midfield development will be designated as the Midfield GA complex. Favored locations for GA development considered topography, environmental impacts, airfield and roadway access and utilities. These criteria were used to evaluate the preferred facility development for each of the GA areas outlined above.

Establishing areas for specific GA functions allows the airport to maximize on-airport development while separating larger aircraft operations from glider, skydiving and ultra-light activity. Further the development of the midfield area and the redevelopment of the closed runways as taxiways will provide HEG the opportunity to provide not only T-hangar facilities but also the opportunity to develop conventional and corporate storage facilities and expanded apron tie-down facilities.

Aircraft storage facilities at HEG consist of a combination of conventional and T-hangars in addition to aircraft tie-down facilities. Aircraft hangar facilities are provided and managed by the Fixed Based Operator, JAA/Herlong Aviation, which also provides airport management. At the time of this writing, the airport's current T-hangars were operating at 100 percent capacity and 14 T-hangar facilities were in the process of being constructed. Still, based upon the airport's existing waiting list as well as forecast demand, hangar storage demand over the long-term planning period is significant. The proposed development options accommodate the capacity requirements outlined in **Chapter 4**, *Demand Capacity and Facility Requirements*, while also providing for various leasehold options and diversification of

revenue. The demand for T-hangars in Florida exceeds the ability of the FDOT to meet anticipated demand for storage facilities. Therefore, if HEG were to build T-hangar facilities beyond those required to meet demand, the Airport may likely attract based aircraft tenants beyond those forecast for the twenty-year planning period.

Proposed GA development concepts build upon the airfield concepts evaluated earlier in the report. The following subsections provide a detailed analysis of GA development in conjunction to proposed airfield development. Following an evaluation of the GA concepts, a preferred concept for each (North and Midfield) may be recommended to provide a framework to support and guide future development at the Airport, including support facilities and landside access.

Each GA development considered storm water retention/drainage improvements, airfield capacity and landside and airside access. Each considers the nine fundamental areas for GA facilities, including:

- Airport Operations Area (AOA) – includes all runways, taxiways, Runway Protection Zones (RPZ), obstacle-free areas, and Federal Aviation Regulations (FAR) Part 77 areas that are object free so as not to affect navigable airspace.

- T-Hangars – as required for the planning period based on the anticipated preference for this type of aircraft storage.

- Conventional Hangars – encompassing conventional hangar storage and maintenance hangars provided by the FBOs.

- Based Aircraft Apron – includes the required based aircraft tie-down apron as well as the areas required for aircraft maneuvering.

- Transient Aircraft Apron – consists of the required transient aircraft parking apron, tie-down and the areas required for aircraft fueling.

- Other Apron Areas – includes the apron areas associated with maneuvering aircraft for storage as well as aircraft maintenance.

- Terminal – includes the terminal and office areas for intermodal and FBO operations.

- Automobile Parking – consists of the required vehicular parking for general aviation facilities.

- Corporate Facilities – represent all hangar storage, aircraft apron, and automobile parking areas for aviation-related businesses and private corporations.

All proposed development was evaluated based upon the assessment criteria of best planning tenets: phasing/construction, operational performance, environmental impacts, fiscal factors and community recommendations and acceptance to determine the preferred development concept for each of the proposed GA development areas. Proposed layouts for GA facilities within the North and Midfield quadrants of the airport are shown in **Figures 5-8 through 5-12**, respectively.

North Landside Development

Included in the North Landside development are options for aircraft storage and associated facilities adjacent to the Airport Entrance Road, Bulk Storage hangar, and Taxiway A. As stated, the North Landside Development is located within the west quadrant of the airfield adjacent to Taxiway A and Normandy Boulevard. This sector contains the majority of development on the airport including aircraft storage, terminal facilities, fuel facilities, aircraft tie-down and automobile parking. Three GA development layouts for this zone were identified and include hangar development, apron expansion and construction, access road improvements, fence line adjustment, surface parking, and airfield access improvements. Order of magnitude cost estimates for each concept is provided in 2006 dollars, and development is shown through the long-term planning period.

Several concepts were considered for the development of the North district including the various undeveloped areas north of the existing FBO and west of T-hangar 10. Due to the anticipated cost of wetland mitigation, development in specific areas was limited. Proposed development consists of aviation development, including hangar storage facilities, apron, automobile parking and access roads. All three concepts considered surface and airfield access, potential environmental impacts, operational considerations, including Part 77 height requirements, facility demand and revenue diversification.

North Landside Concept 1

Concept 1 proposes that aviation and non-aviation tenants continue to use the bulk hangar office facilities, while available lease hold areas would be primarily developed for aircraft storage facilities. Access to on-airport storage, including T-hangar and conventional hangar facilities is provided via the Airport Entrance Road as well as Normandy Boulevard. North Landside Concept 1, shown in **Figure 5-8**, proposes a variety of hangar storage facilities to accommodate small and medium sized aircraft via T-hangars and conventional hangars. T-hangar facilities are to be constructed west of the existing T-Hangars north of the West Apron, and three 100 x 220-foot conventional hangars are to be constructed

between the existing FBO/Bulk Hangar facility and Normandy Boulevard. Access to both the T-hangars and conventional hangars will require a realignment of the T-Hangar access road via the Airport Entrance Road. All the proposed facilities have airside access to Taxiway A via taxiway connectors, and surface parking is provided adjacent to the facilities.

Projects associated with North Landside Concept 1 include construction of:

- One 12-unit T-hangar
- Three (3) 100 x 220-foot Conventional Hangar
- Approximately 3500 SY of Apron Space
- Relocation of T-Hangar Access Road
- Construction of four (4) 35-foot wide Taxilanes
- Approximately 75 parking spaces,
- Access Road Relocation and Extension
- Drainage Improvements, and
- Fencing Relocation

Order of magnitude cost estimates in 2006 dollars are shown in **Table 5-13.**

TABLE 5-13
NORTH LANDSIDE CONCEPT 1
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost
12 T-hangar Units	$1,045,840
3 100' x 220' Conventional Hangars	$10,318,348
Construction of Conventional Hangar Apron	$442,123
Construction of Additional Surface Parking	$337,798
Access Road Relocation and Extension	$103,875
Fencing Relocation	$7,470
Drainage Improvements	$23,000
Total Phase I Development Costs[1]	**$12,478,503**

[1] Project Costs include 20% engineering and contingency fee

Source: The LPA Group, Incorporated, 2006

A comparison of the anticipated impacts associated with the proposed development is outlined below:

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North Landside Concept 1

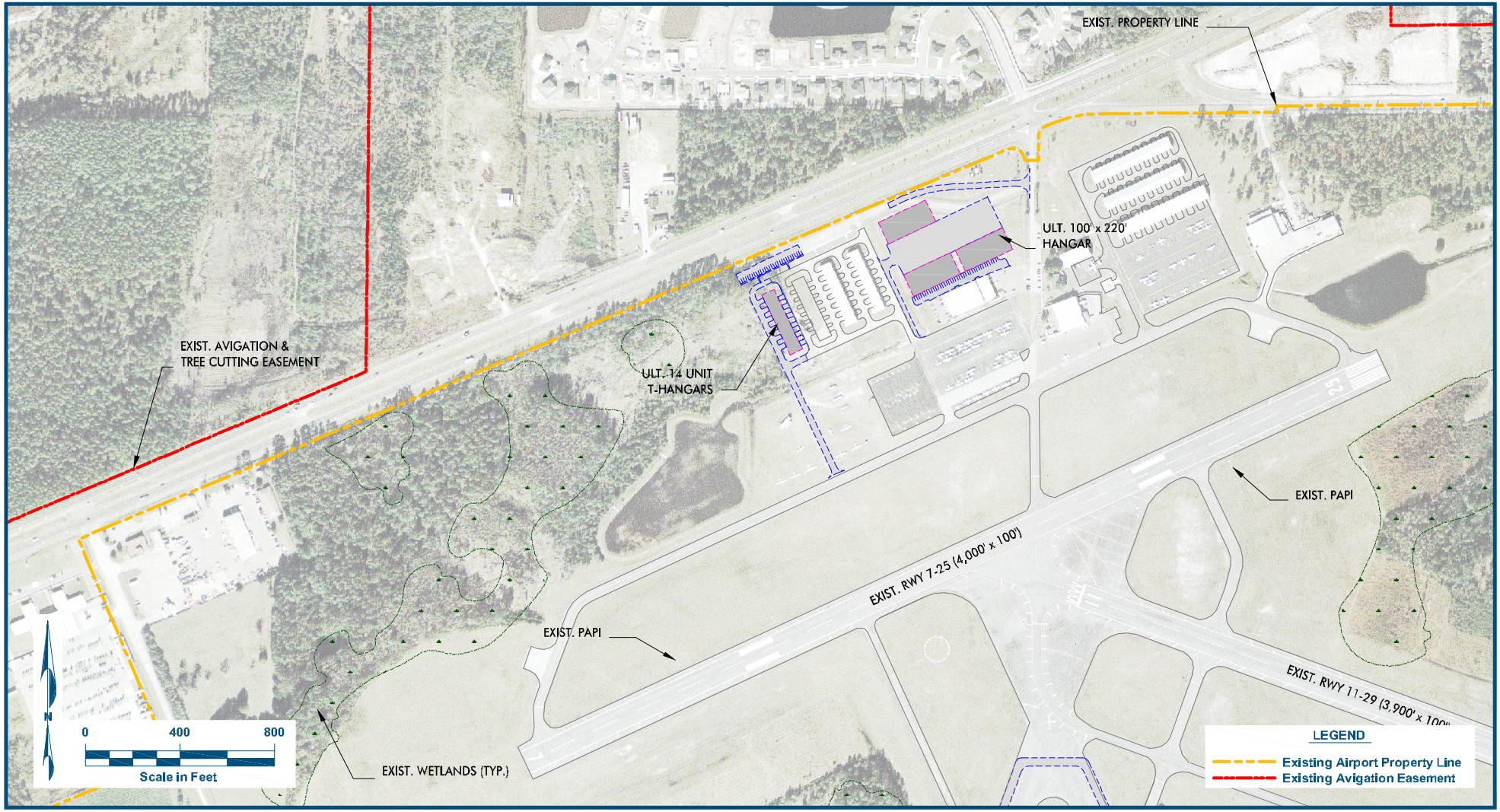

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Figure 5-8

NORTH LANDSIDE DEVELOPMENT CONCEPT 1 *Source: The LPA Group Incorporated, 2006*	
Strengths	**Weaknesses**
1. Utilizes existing airport property and requires no land acquisition 2. Provides a mix of aircraft storage facilities 3. Provides adequate automobile parking	1. Requires fence line adjustment to accommodate development 2. Will require drainage improvements of approximately $23,000 3. Does not meet T-hangar demand over the long-term planning period. 4. Cost = $12.5 million 5. Requires the relocation of the T-Hangar Access Road

North Landside Concept 2

North Landside Concept 2, shown in **Figure 5-9**, also proposes a mix of hangar storage facilities to accommodate small and medium sized aircraft via T-hangars and conventional hangars. T-Hangar facilities are provided throughout the north side, including west of the existing T-hangars adjacent to the retention pond, north of the bulk hangar facility, and south of T-hangars 1, 2 and 3. Conventional hangars will be constructed north of the Mercair Facilities adjacent to T-hangars 1, 2 and 3. Landside access is primarily provided via the Airport Entrance Road. Automobile parking is provided adjacent to both the T-hangar and Conventional aircraft storage facilities. Airside access for all development is provided via taxi lanes to Taxiway A and the East and West Aprons.

Projects associated with North Landside Concept 2 include construction of:
One 12-Unit T-Hangars

- Two 22-Unit T-Hangars
- Three 14-Unit T-Hangars
- Two 100' x 170' Conventional Hangars
- Expansion of West Apron
- Construction of Approximately 3,800 SY Conventional Hangar Apron
- Expansion of East Apron north of Taxiway A,
- Relocation of T-Hangar Access Road

- Construction of 25 parking spaces
- Drainage Improvements, and
- Taxilane Construction

Order of magnitude cost estimates in 2006 dollars are shown in **Table 5-14**.

TABLE 5-14
NORTH LANDSIDE CONCEPT 2
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost
One 12-Unit T-Hangars	$1,045,840
Two 22-Unit T-Hangars	$3,834,747
Three 14-Unit T-Hangars	$3,660,440
Two 100 x 170-foot Conventional Hangars	$5,119,470
Expansion of West Apron	$471,050
Conventional Hangar Apron (3,800 SY)	$478,800
Expansion of East Apron	$1,570,582
Relocation of T-Hangar Access Road	$103,875
Construction of Surface Parking	$186,204
Drainage Improvements	$200,000
Taxilane Construction	$165,800
Fenceline Relocation	$9,780
Total Phase I Development Costs[1]	**$16,846,588**

[1] *Project Costs include 20% engineering and contingency fee*

Source: The LPA Group, Incorporated, 2006

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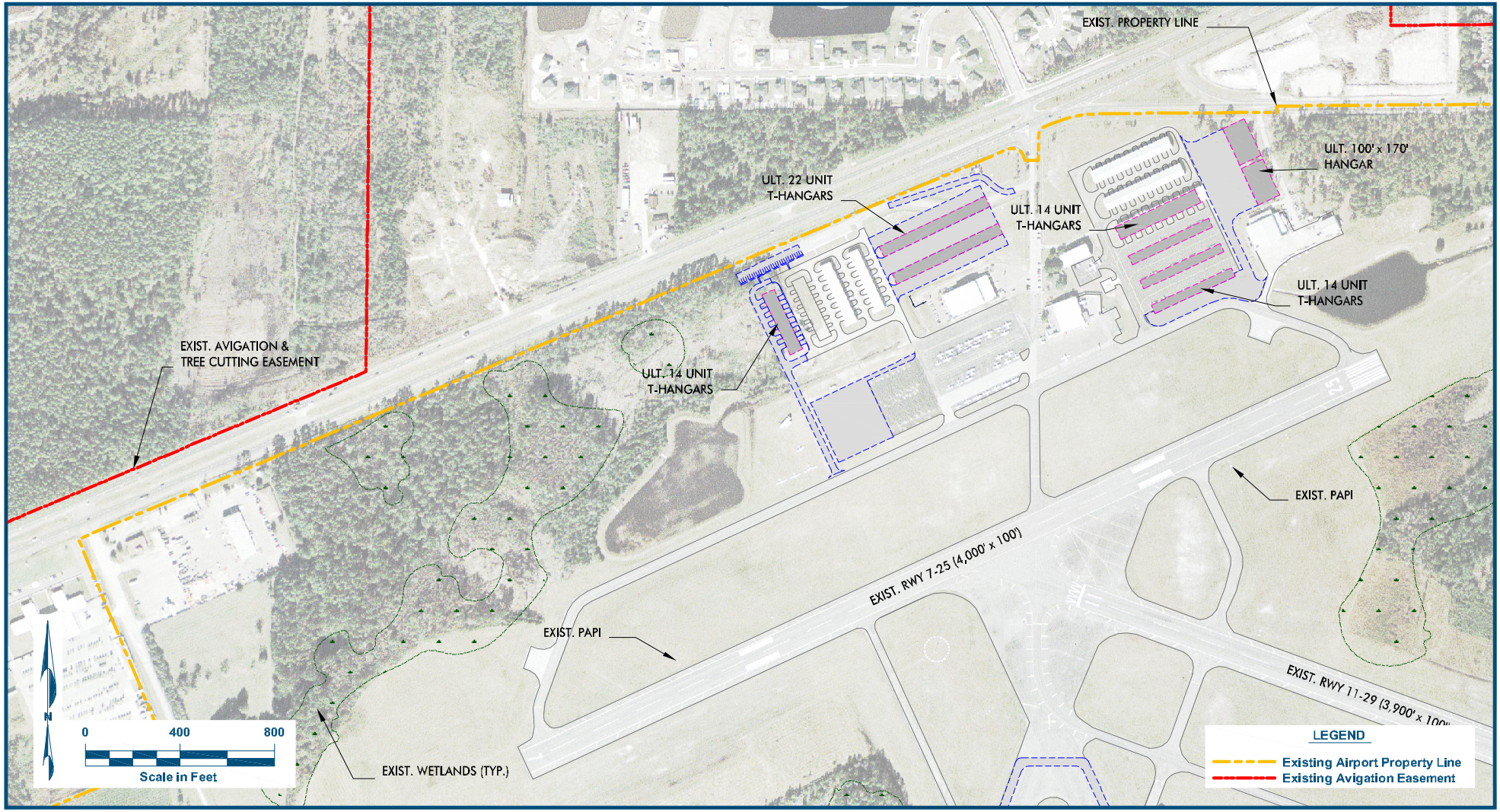
North Landside Concept 2



LPA

Figure 5-9

A comparison of the anticipated impacts associated with the proposed development is outlined below:

NORTH LANDSIDE DEVELOPMENT CONCEPT 2 *Source: The LPA Group Incorporated, 2006*	
Strengths	Weaknesses
1. Utilizes existing airport property, therefore, no land acquisition required 2. Provides mix of aircraft storage facilities 3. Accommodates long-term automobile parking and aircraft apron space 4. Accommodates short and mid-term T-Hangar demand	1. Will require additional drainage improvements 2. Will require realignment of internal T-Hangar Access Road 3. Will require relocation of Fence line 4. Cost is approximately $16.8 5. Does not accommodate forecast corporate demand

North Landside Concept 3

North Landside Concept 3, shown in **Figure 5-10**, provides a variety of aviation storage facilities including: T-hangar, corporate, conventional and shade hangars. This concept accommodates mid to long-term aviation storage demand and improves landside and airfield access with the realignment of the Airport Entrance Road. As part of aircraft storage development, additional taxi lanes will be constructed as well as auto parking facilities. T-hangars will be constructed along the East and West Apron areas and conventional and corporate hangar facilities will be constructed north of Taxiway A and behind the FBO/Bulk Hangar.

Projects associated with North Landside Concept 3 include construction of:

- Three 14-Unit T-Hangars
- Three 100 x 100-foot Corporate Hangars
- One 100 x 120-foot Corporate Hangar
- One 70 x 70-foot Corporate Hangar
- Two 60 x 60-foot Corporate Hangars
- Two 100 x 170-foot Conventional Hangars
- One 14-Unit T-Hangar
- Two 14-Unit Shadeports
- West Apron Expansion

- Conventional and Corporate Hangar Apron Construction
- Airport Entrance Road Realignment
- Realignment and construction of additional surface parking
- Improvements to Drainage Facilities
- Construction of Taxilanes, and
- Fence line Relocation

Order of magnitude cost estimates in 2006 dollars are shown in **Table 5-15**.

TABLE 5-15
NORTH LANDSIDE CONCEPT 3
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost
Three 12-Unit nested T-Hangars	$3,137,520
Three 100' x 100' Corporate Hangars	$4,690,158
One 100' x 120' Corporate Hangar	$1,848,057
One 70' x 70' Corporate Hangar	$805,952
Two 60' x 60' Corporate Hangars	$1,133,324
One 8-Unit T-Hangar	$697,227
Two 100' x 170' Conventional Hangars	$5,119,470
One 14-Unit nested T-Hangar	$1,220,147
Two 14-Unit nested Shadeports	$168,000
West Apron Expansion	$771,050
East Apron Expansion (13,424 SY)	$1,570,582
Conventional and Corporate Hangar Apron Construction	$273,214
Airport Entrance Road Realignment	$103,875
Construction and Realignment of Surface Parking	$112,800
Drainage Improvements	$200,000
Relocate Access Road to T-Hangars 1, 2 and 3	$103,875
Taxilane Construction	$283,530
Perimeter Fence line Realignment	$25,600
Automobile Parking	$134,704
North Landside Concept 3 Preliminary Costs[1]	**$22,399,085**

[1] *Project Costs include 20% engineering and contingency fee*

Source: The LPA Group, Incorporated, 2006

JACKSONVILLE AVIATION AUTHORITY

North Landside Concept 3

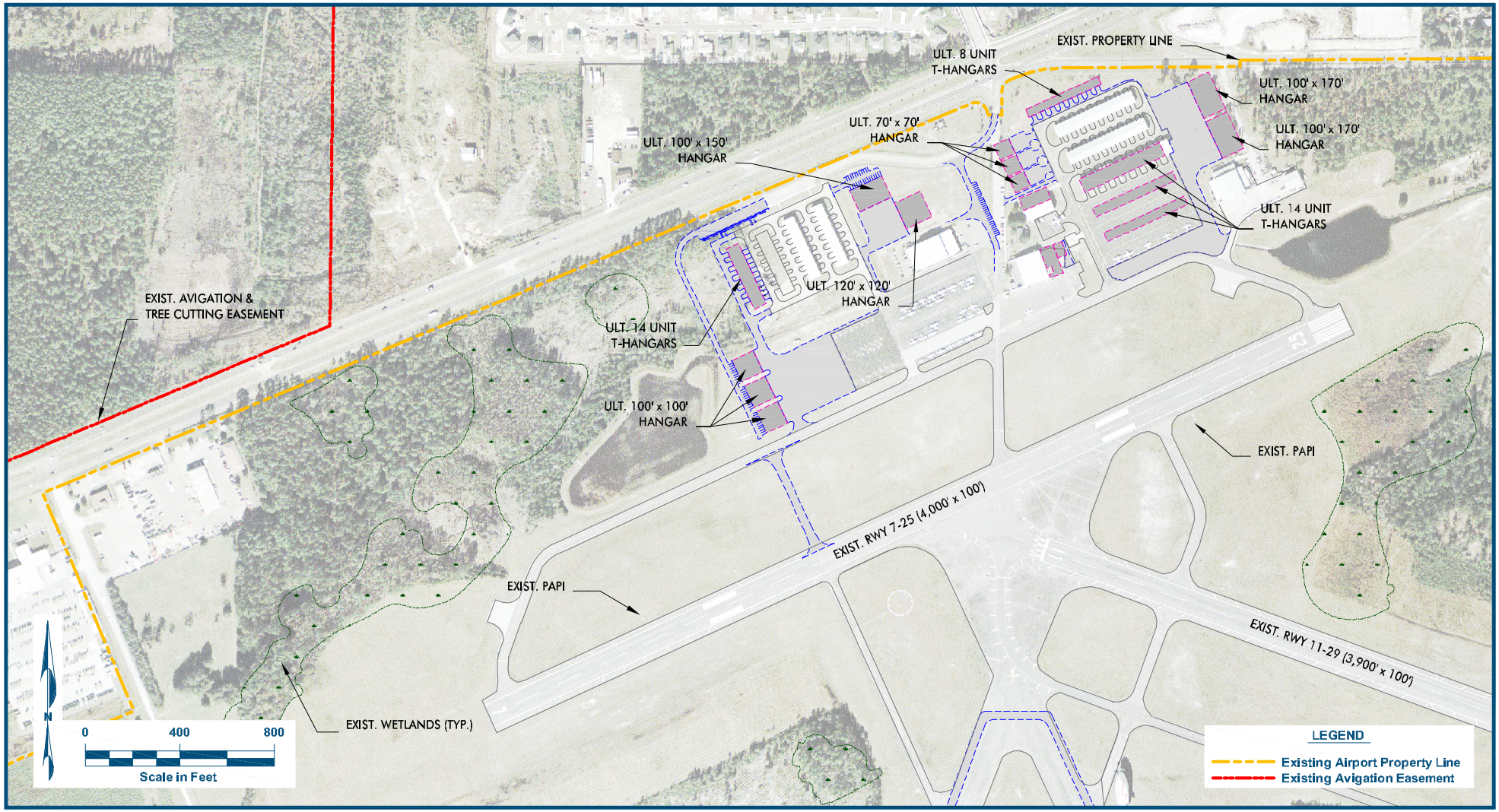


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Figure 5-10

A comparison of the anticipated impacts associated with the proposed development is outlined below:

NORTH LANDSIDE DEVELOPMENT CONCEPT 3 *Source: The LPA Group Incorporated, 2006*	
Strengths	**Weaknesses**
1. Utilizes existing Airport property and doesn't require land acquisition 2. Provides a mix of facilities for aircraft hangar storage 3. Accommodates long-term Aircraft Storage Demand 4. Provides long-term automobile parking facilities and aircraft ramp space 5. Relocation of Entrance Road allows for existing parking realignment, and improved access. 6. Allows for expansion of Terminal and existing airport tenant facilities	1. Requires fence line adjustment to accommodate development 2. Will require additional drainage facilities 3. Significant cost: $22.3 million

Evaluation Criteria

A single concept or a combination of elements from two or more concepts presented will serve as the framework for future development. Concepts were evaluated within this section to weigh the inherent strengths and weaknesses of each in comparison to each other and based upon the following evaluation criteria.

- Ease of implementation
- Efficiency in meeting facility requirements
- Engineering factors
- Phasing
- Airside and landside accessibility
- Environmental impacts
- Integration with the airfield
- Ease of ground access to existing and future roadways
- Impact to other aviation related uses on the Airport,
- Overall cost of development, and
- Availability of requisite infrastructure

Table 5-16 presents an evaluation matrix that addresses the aforementioned criteria. This matrix summarizes the consultant's analyses of the development concepts presented in the following paragraphs

TABLE 5-16
NORTH LANDSIDE DEVELOPMENT EVALUATION MATRIX

	Concept 1 Rating	Concept 2 Rating	Concept 3 Rating
Legend: 1. Poor 2. Fair 3. Satisfactory 4. Very Good 5. Excellent			
Best Planning Tenets			
Meets Facility Requirements	2	4	5
Availability of requisite Infrastructure	2	3	4
Ease of implementation	4	4	4
Conforms to Sponsor's vision	1	4	5
Phasing/Construction			
Ability to Phase Construction/Expansion	5	5	5
Impact on existing facilities	4	4	5
Engineering or Land Build-out Requirements	4	4	4
Operational Performance			
Airside and landside accessibility	4	4	4
Integration with the airfield	4	3	4
Ease of ground access to existing and future roadways	4	4	5
Impact to other aviation related uses	3	4	5
Environmental Impacts	4	4	4
Fiscal Factors			
Cost Estimates	4	3	3
Subtotal	45	50	57
Average	3.46	3.85	4.38

Source: The LPA Group Incorporated, 2006

Recommended North Landside Development

Recommended North Landside development consists primarily upon development outlined in Concept III. However, proposed shade hangars along the east apron would be replaced by T-hangars as shown in Concept II. Concept III provides a mix of conventional, corporate and T-Hangar as well as automobile parking and aircraft ramp space necessary to accommodate mid to long-term demand. The preferred concept identifies hangar space likely to accommodate projected changes in operational fleet mix and conforms to both the Sponsor's and airport users strategic vision.

Potential Environmental Impacts

The project location for the proposed North Landside Development is located within a developed area, which does not contain wetlands or suitable protected species habitat. Therefore, no wetland or protected species impacts are anticipated as a result of the project.

Regulatory Requirements

FAA National Policy Order 1050.1E Change 1 contains policies and procedures for compliance with the National Environment Policy Act (NEPA). Environmental survey and documentation will be required to determine if the proposed project(s) have a significant impact on the human environment. Based upon the literature review and a preliminary environmental survey, proposed projects would likely be processed as a Categorical Exclusion (**FAA Order 1050.1E Change 1 Chapter 310**). However, the runway and parallel taxiway projects proposed may or may not require an environmental assessment. A further evaluation of potential impacts will be required prior to design and construction.

State Permit

According to **Florida Administrative Code (F.A.C.) Chapter 40C-4**, *Environmental Resource Permits for Surface Water Management Systems*, the proposed development will require a St. John's River Water Management District (SJRWMD) Environmental Resource Permit (ERP) in order to meet stormwater runoff treatment and water quality regulatory requirements.

City of Jacksonville Concurrency Compliance

The City of Jacksonville has implemented a Concurrency Management System Ordinance, Chapter 655, of the Ordinance Code to provide a local structure for administering state law. The concurrency requirement mandates that before any proposed development can obtain a final development order, it must be demonstrated that its impact can be adequately absorbed by the existing public facilities scheduled to serve it (Section 655.105(r) Ordinance Code). If it is determined that a public facility cannot absorb a proposed development's impact, the project cannot go forward until the situation is corrected. However, according to state law, projects may be grandfathered if the proposed development is included in an approved development plan prior to a date covered in the law.

Improvements subject to concurrency requirements include: final engineering drawings for any new subdivision; building permits for any new buildings, non-residential additions or accessory building, new mobile home move on, trailer parks or camps; building permits for any non-residential alterations

or repairs, residential and non-residential foundations only, converting uses or "other" types of development not found to be de minimis development.

However, Florida Statutes Chapter 163.3180, Concurrency, states that "A local government may grant an exception from the concurrency requirement for transportation facilities if the proposed development is otherwise consistent with the adopted local government comprehensive plan and is a project that promotes public transportation or is located within an area designated in the comprehensive plan for: urban infill development, urban redevelopment or downtown revitalization. ... Further, "Each local government may adopt as part of its long-term development transportation concurrency management system with a planning period of up to 10 years for specially designated districts where a backlog exists."[2]

In addition, under Chapter 655.108, Exemptions; completed structures; de minimis development, "not all development or development activity impacts area significant enough to cause a deterioration in the levels of service as adopted in the City of Jacksonville 2010 Comprehensive Plan." A de minimis impact is defined as an impact that would not exceed one (1) percent of maximum volume of the adopted level of service as determined by the local government.

According to COJ, the following development shall be exempt from concurrency management system (CMS) review:

- "A change in the use of a structure completed as of April 25, 1991, without addition of square footage, from a lawful use within a presently applicable zoning district to a similar permitted use within the same zoning district.
- A development with a vehicular trip generation rate of ten or less average daily trips (ADT) according to the latest ITE Trip Generation Manual, and
- All public facilities necessary to ensure the protection of the health, safety and general welfare of the citizens of the City of Jacksonville, including all public facility construction projects included in the Capital Improvement Program and Capital Improvement Element of hte 2010 Comprehensive plan which are required to ensure compliance with all adopted levels of service, shall be exempt from concurrency review."[3]

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[2] 2006 Florida Statutes, Part II, Growth Policy; County and Municipal Planning; Land Development Regulation, Chapter 163.3180, Concurrency, 5(b) and (e)

[3] 2007 City of Jacksonville Concurrency Management System Ordinance, Chapter 655, Sections 108, Exemptions; Completed Structures; de minimis development.

Since it is anticipated that proposed on-airport development will impact to some degree existing public use facilities, coordination with the COJ's Concurrency Management Office is recommended. In an effort to facilitate this process, members of the COJ Planning Department participated on the Technical Advisory Committee. It was recommended that for all future development that JAA obtain a Concurrency Reservation Certificate in order to obtain long-term commitments from the City. Although detailed roadway concurrency issues are not part of this scope of work, it was important to note that portions of Normandy Boulevard and Herlong Road have already exceeded their capacity according to the City of Jacksonville Road Links Status Report, dated February 2007. As a result, further on-airport development and actions should be coordinated with the City prior to design as part of the City's efforts to improve access in and around HEG.

Midfield Concept Development

Several general aviation concepts were considered for the grassy area adjacent and between the closed runways. A few box hangar facilities are currently located adjacent to the closed runways, but no utilities are located on the Southside of the airfield. As part of any proposed development, utilities, roadway access and possibly wetland mitigation will need to be considered. As outlined in Airfield Concepts 1 through 3, the closed runways will be redeveloped as taxiways to provide access to existing and proposed development.

Proposed development consists of hangar storage facilities, maintenance hangars, apron, automobile parking and access roads that support aviation growth. Considering surface and airfield access, environmental impacts, operational considerations, including Part 77 height requirements, facility demand and revenue diversification, two concepts for the Midfield GA Aviation Complex were developed.

Midfield Concept 1

Midfield Concept 1, shown in **Figure 5-11**, proposes a variety of hangar storage facilities to accommodate small and medium sized aircraft via T-hangars, box hangars and corporate hangars. In addition to hangar storage facilities, tie-down storage is also proposed for this area. A 100 foot x 150 foot hangar is constructed in the northern section of the midfield. This hangar serves as a secondary FBO or an aircraft maintenance facility, while the associated apron is used for aircraft parking. Directly to the south of the FBO/maintenance hangar, three rows of T-hangars are constructed, while four rows

of corporate hangars are constructed to the south of the FBO/maintenance apron.

Further to the south of the proposed T-hangars, a corporate hangar complex is constructed. Landside access to the all the new development is provided via the existing airport perimeter road to the south of the airfield. The perimeter road runs north-south along the side of each taxiway. The taxiway to the south is converted into an east-west access road. Automobile parking for the proposed corporate hangars and the FBO/maintenance hangar is constructed to the rear of these facilities, while automobile parking for the box hangars is located to the south of the hangars. All the proposed facilities have airside access to converted taxi lanes via taxiway connectors.

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Midfield Concept 1

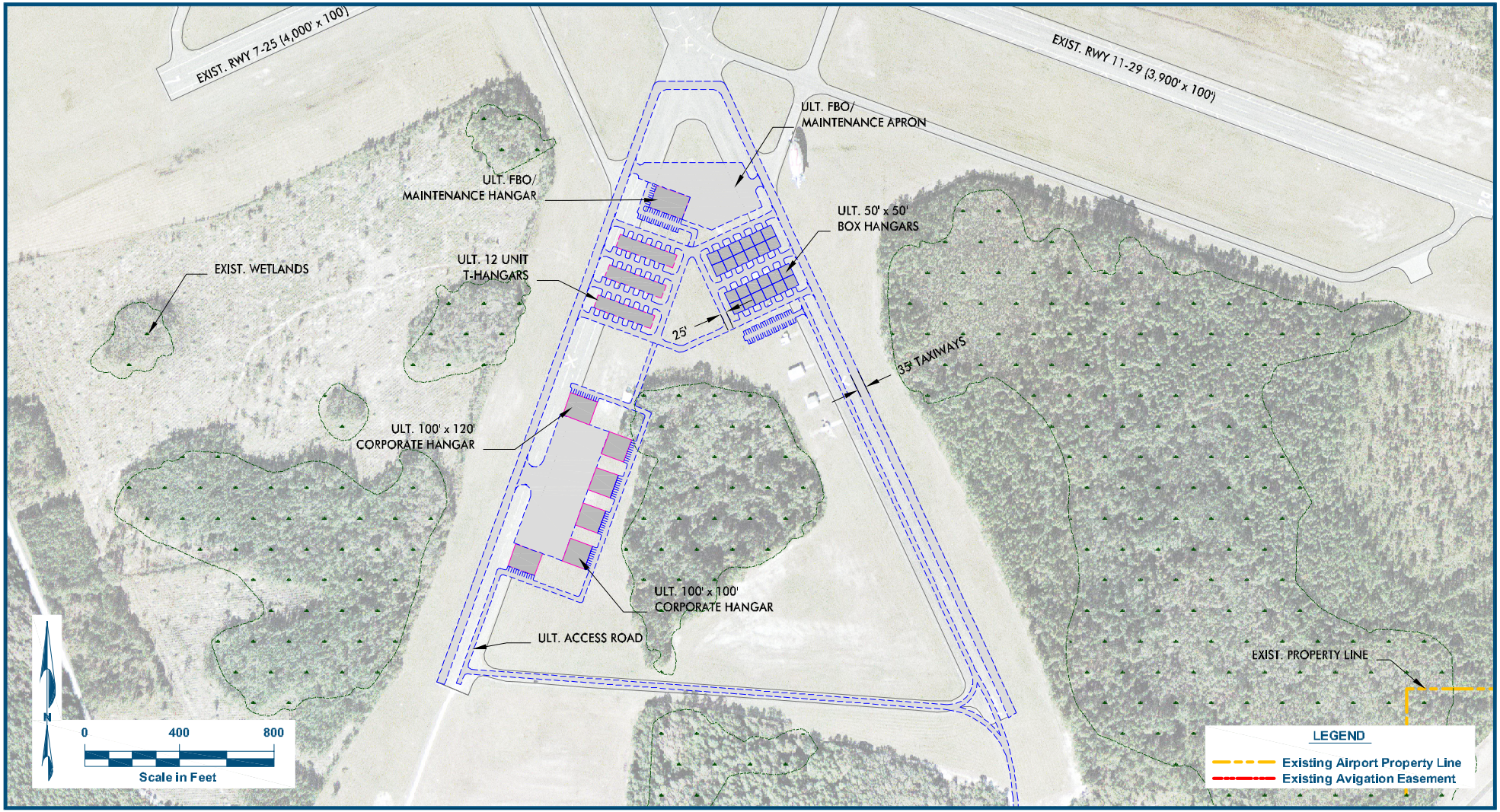

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Figure 5-11

Projects associated with Midfield GA Concept 1 include construction of:

- Three (3) 12-unit T-Hangars
- One (1) 100 x 150-foot FBO/Maintenance office and hangar
- Twenty-four (24) 50 x 50-foot Corporate Hangars
- Four (4) 100 x 100-foot Corporate Hangars
- Two (2) 100 x 120-foot Corporate Hangars
- FBO/Maintenance Apron
- Corporate Hangar Apron
- Access Road Construction
- Automobile Parking
- Fenceline Realignment
- Taxilane Construction,
- Utility Installation, and
- Drainage Improvements

Order of magnitude cost estimates in 2006 dollars are shown in **Table 5-17**.

TABLE 5-17
MIDFIELD CONCEPT 1
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost
Three 12-unit T-hangars	$3,137,520
One (1) 100 x 150-foot FBO Offices & Hangar	$2,275,064
24 50 x 50-foot Corporate Hangars	$9,380,304
Four 100 x 100-foot Corporate Hangars	$8,708,667
Two 100 x 120-foot Corporate Hangars	$3,697,000
FBO/Maintenance Apron	$3,430,855
Corporate Area Aprons	$1,736,000
Access Road Construction	$2,261,659
Surface Parking	$331,042
Taxi lane Construction	$977,480
Electrical Utility Installation*	$800,000
Drainage Improvements*	$450,000
Total Development Costs[1]	**$37,185,591**

[1] *Project Costs include 20% engineering and contingency fee*

Source: The LPA Group, Incorporated, 2006

A comparison of the anticipated impacts associated with the proposed development is outlined below:

MIDFIELD GA DEVELOPMENT
CONCEPT 1

Source: The LPA Group Incorporated, 2006

Strengths	Weaknesses
1. Utilizes existing airport property and doesn't require land acquisition 2. Provides a mix of aircraft storage facilities 3. Provides parking, hangar and apron for growth beyond the forecast years. 4. Exceeds corporate and conventional hangar demand 5. Provides for an additional FBO facility or maintenance facility	1. Will require storm water/drainage retention facilities 2. No utilities (i.e. electricity, water, sewer, etc.) 3. Initial Costs ~37.1 million for structural development only 4. Limits tie-down facilities

Midfield Concept 2

Midfield GA Concept 2, shown in **Figure 5-12**, also proposes a variety of hangar storage facilities including T-hangars, corporate hangars, and conventional hangars. In addition to hangar storage facilities, tie down storage was also provided. The tie-downs are located to the north section of the Midfield. Two rows of corporate hangars are constructed to the south of the tie downs. Four rows of T-hangars are constructed south of the corporate hangars. The conventional hangar complex is constructed to the south of the T-hangars. A 100 foot x 150 foot hangar is constructed in the south west side of the conventional hangar complex. This hangar serves as a secondary FBO or an aircraft maintenance facility, while the associated apron is used for aircraft parking. Landside access to new development is provided via the existing perimeter road to the south of the airfield. As a result, the taxiway to the south is converted into an east-west access road. Automobile parking for the proposed conventional hangars and the FBO/maintenance hangar is constructed to the rear of these facilities, while tenants of the corporate hangars and T-hangars typically park their automobile in their hangars. All the proposed facilities have airside access to converted taxi lanes via taxiway connectors. This alternative provides JAA with additional flexibility for future development, and accommodates anticipated demand beyond the twenty-year planning period.

Projects associated with Midfield GA Concept 2 include construction of:

- Sixteen (16) 50 x 50-foot Corporate Hangars
- Four (4) 12-unit T-Hangars
- Four (4) 120 x 100-foot Hangars
- 150 x 100-foot Conventional Hangar
- Hangar Apron
- FBO/Maintenance Facility
- FBO/Maintenance Apron
- Tie-Down Apron
- Surface Parking
- Access Road Extension
- Taxilane Construction
- Drainage Improvements, and
- Installation of Utilities

Additional construction associated with the hangar development includes fence line adjustments, construction of two taxiway connectors and the widening of one taxiway connector. Order of magnitude cost estimates in 2006 dollars are shown in **Table 5-18**.

TABLE 5-18
MIDFIELD CONCEPT 2
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost
16 50 x 50-foot Corporate Hangars	$6,253,536
Four 12-unit T-Hangars	$4,183,360
Four 120 x 100-foot Corporate Hangars	$7,392,228
150 x 100-foot Conventional Hangar	$2,345,079
Hangar Apron	$882,000
FBO/Maintenance Facility	$2,275,064
FBO/Maintenance Apron	$3,430,855
Tie-Down Apron	$168,000
Surface Parking	$331,042
Access Road Construction	$2,261,659
Taxilane Construction	$977,480
Drainage Improvements*	$450,000
Electrical Utilities*	$800,000
Preliminary Development Costs[1]	**$31,750,303**

[1] *Project Costs include 20% engineering and contingency fee*

Source: The LPA Group, Incorporated, 2006.

MIDFIELD GA DEVELOPMENT
CONCEPT 2

Source: The LPA Group, Incorporated 2006

Strengths	Weaknesses
1. Utilizes existing airport property and doesn't require land acquisitions 2. Provides a mix of aircraft storage facilities 3. Exceeds automobile parking, hangar and apron space requirements 4. Exceeds corporate and conventional hangar demand 5. Provides for an additional FBO facility or maintenance facility	1. Will require drainage improvements 2. Will require utility installation 3. Will require access road extension and realignment 4. Significant cost for development (~$31.7 million)

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Midfield Concept 2

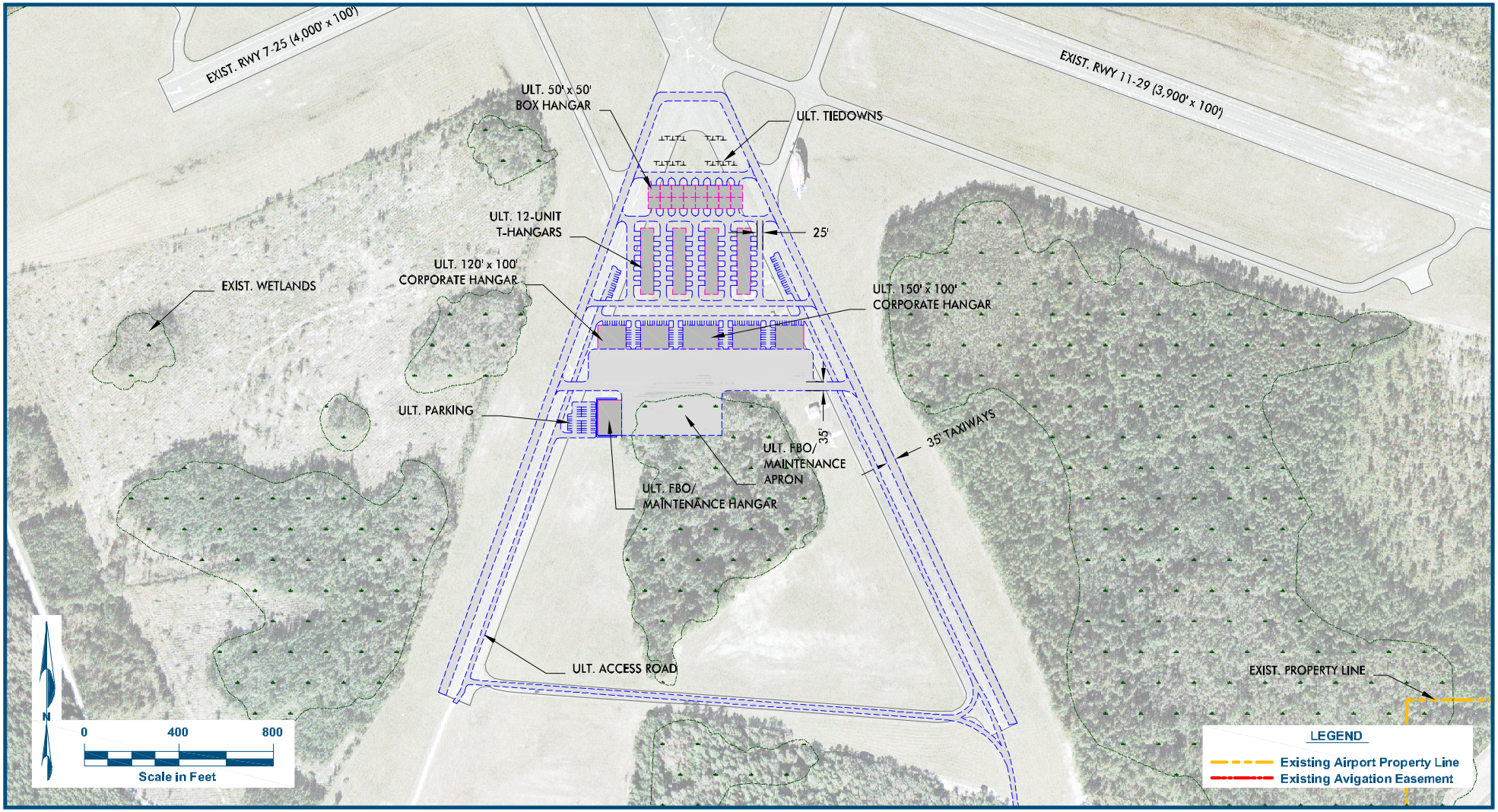

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Figure 5-12

Evaluation Criteria

The Airport development plans described previously for Midfield GA development outline the necessary facility improvements to meet forecast demand while creating an environment for future diversification and development as well as fiscal viability. In evaluating landside and airside elements associated with the Midfield GA Development, each concept was weighed as to its inherent strengths and weaknesses in comparison to other concepts as well as against the evaluation criteria outlined in **Table 5-19**.

TABLE 5-19
MIDFIELD GA DEVELOPMENT EVALUATION MATRIX

	Concept 1	**Concept 2**
	Rating	**Rating**
Legend: 1. Poor 2. Fair 3. Satisfactory 4. Very Good 5. Excellent		
Best Planning Tenets		
Meets Facility Requirements	4	5
Availability of requisite Infrastructure	1	1
Ease of implementation	3	3
Conforms to Sponsor's vision	4	3
Phasing/Construction		
Ability to Phase Construction/Expansion	4	4
Impact on existing facilities	4	4
Engineering or Land Build-out Requirements	4	4
Operational Performance		
Airside and landside accessibility	4	4
Integration with the airfield	4	4
Ease of ground access to existing and future roadways	3	3
Impact to other aviation related uses	3	4
Environmental Impacts	2	2
Fiscal Factors		
Cost Estimates	2	2
Subtotal	42	43
Average	3.23	3.31

Source: The LPA Group Incorporated, 2006

Recommended Midfield Development

The recommended development option for the Midfield at HEG considered all input and recommendations provided by JAA Staff, Airport Management, the TAC, and the general public.

Although both concepts are similar in terms of hangar and apron space, the orientation and layout of Concept II is more favorable with respect to its integration with the rest of the airfield and its impact to other aviation related uses. Both concepts provide a mix of hangar facilities, including large corporate hangars and a maintenance hangar, each varying in size and quantity. In addition, the recommended concept also provides space for aircraft tie-downs. Concept II centralizes these facilities and developments, allowing better integration and adjacency with parking, aircraft storage areas and roadway access. Therefore, it is recommended that Concept II for the Midfield GA Development Area be implemented.

Potential Environmental Impact

The Mid-Field Development is proposed within a developed area that contains a wetland and unsuitable upland habitat for protected species. Minimal impacts to the wetland or wetland-dependent protected species are anticipated as a result of the proposed development. No impact to upland-dependent protected species is anticipated as a result of the proposed development.

Regulatory Requirements

An environmental survey and documentation will be necessary to determine if the proposed development would have a significant effect on the human environment. According to the results of the literature review and preliminary environmental survey, the proposed development has the potential for minimal wetland impacts and would likely be classified as a Categorical Exclusion or a Categorical Exclusion with Environmental Conditions.

State Permit

The proposed development will also require an ERP from SJRWMD, in order to meet wetlands, stormwater runoff treatment, and water quality regulatory requirements. The ERP application also serves as an application for a United States Army Corps of Engineers (COE) Dredge and Fill (Section 404) permit.

City of Jacksonville Concurrency Issues

Since it is anticipated that proposed development will impact Normandy Boulevard as well as future wastewater treatment, power substations, potable water etc., JAA in coordination with the City of Jacksonville, must coordinate development over the twenty year planning period. Prior to design and

construction, JAA should apply for a Concurrency Reservation in order to limit possible development within the vicinity of the airport that negatively impacts future development. Prior to development, the FAA will require a Cost-Benefit Analysis in order to provide funding. Concurrency issues related to utilities and access should be addressed at this time.

Industrial/Commerce Park Development

As discussed earlier, three sectors of the airport were identified for potential commerce and industrial park development. These sectors include: the West Zone adjacent to Normandy Boulevard and the Advanced Disposal Site, the East Zone located between Runways 29 and 25, and the South Zone on the property south of the closed runways. All three areas provide potential for future development and additional revenue generation. Order of magnitude costs and impacts for each region are outlined in the following paragraphs.

West Industrial Development

Proposed west industrial development is located north of Taxiway A and adjacent to various on-airport lease holds including Advanced Disposal and National Guard. A preliminary layout of potential commercial development is shown in **Figure 5-13**, *West Industrial Zone*. The west industrial zone consists of approximately 84.4 acres of land providing direct access to Normandy Blvd. Due to the location of existing businesses along Normandy, an access road off of Normandy will be constructed to provide access to storage facilities, offices and possibly a restaurant to be located south of existing businesses. The location is ideal for short-term industrial and business development because of surface access, availability of utilities, and limited pre-development costs compared to the South and West development zones.

Potential projects associated with the West Industrial Park development include:

- Preliminary Site Development
- Airport Fence line relocation
- Access Road Construction, including lighting, drainage, and markings
- Extension and expansion of utilities
- Construction of x facilities, including parking
- Construction of Restaurant, including parking, and

- Drainage Improvements

Preliminary order of magnitude costs associated with development are included in **Table 5-20**. It is important to note that JAA may only be required to cover the cost of preliminary site development, fence line relocation and the installation or expansion of utilities. Thus, allowing potential tenants to incur the cost of development. It is recommended that revenue streams associated with industrial and commercial development include land rather than building leases.

TABLE 5-20
WEST INDUSTRIAL PARK DEVELOPMENT
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost
Preliminary Site Development	$200,000
Fence line Relocation	$15,000
Roadway Improvements and access	$546,000
Restaurant Construction, including Parking	$5,000,000
Drainage Improvements	$123,500
Total Development Costs[1]	**$5,844,500**

[1] Project Costs include 20% engineering and contingency fee

Source: The LPA Group, Incorporated 2006

WEST INDUSTRIAL PARK DEVELOPMENT *Source: The LPA Group, Incorporated 2006*	
Strengths	**Weaknesses**

1. Provides an additional source of on-going revenue 2. Utilizes existing airport property 3. Provides a buffer between airport development and off-airport residential development 4. May attract both aviation and non-aviation businesses 5. Provides facilities for the benefit of the community as a whole 6. Access to Normandy Blvd, and proximity to existing utilities 7. Compatible land use	1. Approximately $ for pre-development 2. Expansion of utilities required 3. Fence line will need to be realigned 4. Access road and pre-development costs 5. Likely to increase demand on Normandy Blvd

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West Industrial Zone

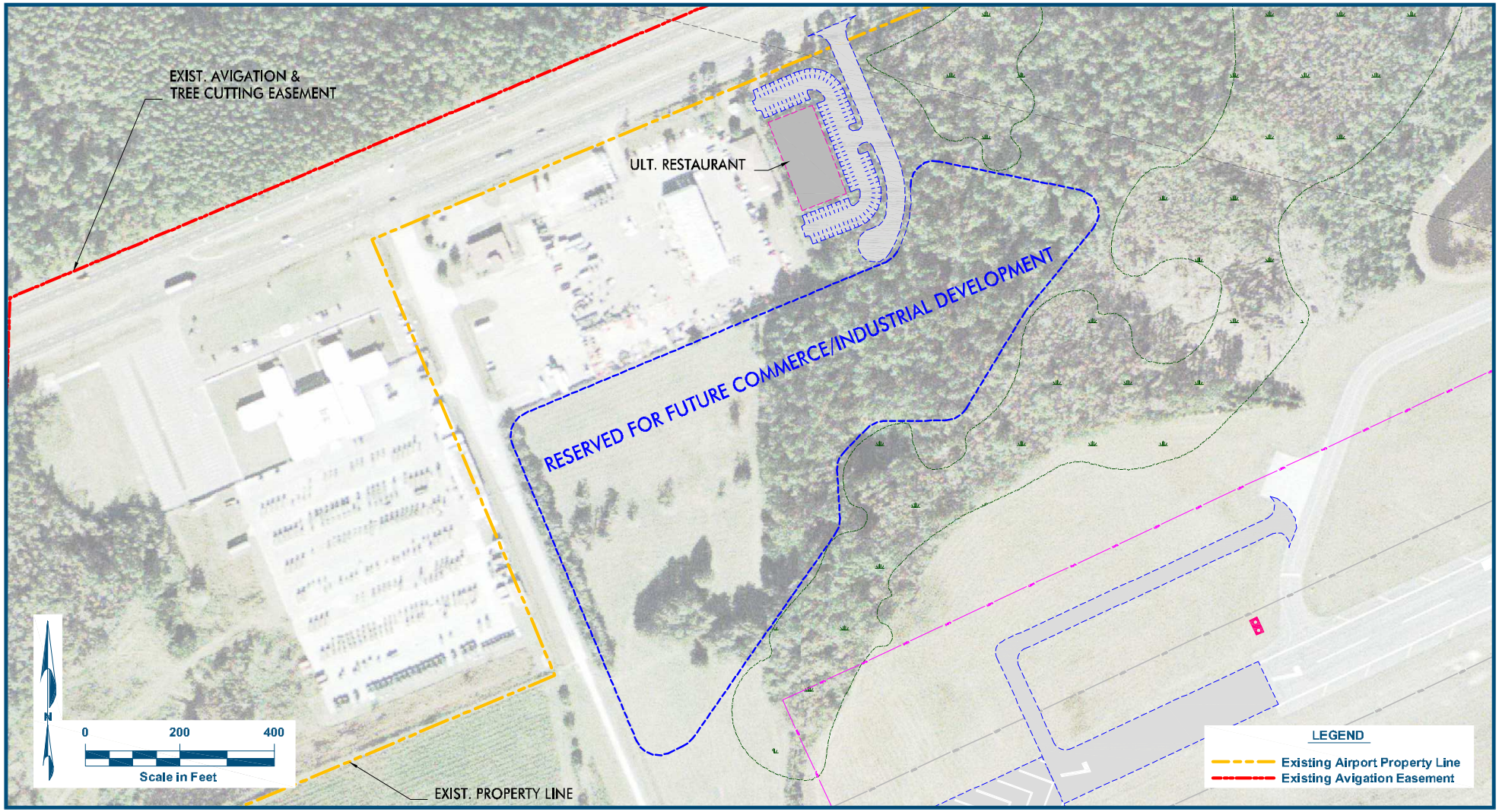

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Figure 5-13

East Commerce Park Development

The proposed East Commerce Park is recommended to be located within the currently undeveloped portion of the airfield between Runways 25 and 29. The Commerce Park would primarily consist of office buildings as well as some storage facilities. Access to the proposed Commerce Park would likely be provided via Herlong Boulevard in order to limit potential impact to existing wetlands. Proposed development would be located on upland areas adjacent to Runway 29. A preliminary drawing of potential development is provided in **Figure 5-14**. Projects associated with preliminary development include:

- Site Pre-development
- East Commerce Park Access Road and Auto Parking
- Construct 30 10,000 SF Office Buildings, including parking
- Construct five (5) 20,000 SF Office Buildings, including parking
- Utilities (Water, Sewer, Electrical, etc)
- Drainage improvements, and
- Airport Fence Line Relocation

Preliminary costs associated with proposed commerce park development are outlined in **Table 5-21**. However, if JAA provides a land lease only for proposed development, then the anticipated cost will be significantly lower (~6.4 million).

TABLE 5-21
EAST COMMERCE PARK DEVELOPMENT
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost
Site Pre-Development	$300,000
Access Road and Auto Parking	$3,945,216
Construct 30 10,000 SF Office Buildings	$37,055,000
Construct five 20,000 SF Office Buildings	$12,351,110
Utilities*	$1,105,050
Drainage Improvements	$900,000
Fence line adjustment	$223,000
Total Development Costs[1]	**$55,879,376**

** Estimate*
[1] Project Costs include 20% engineering and contingency fee

Source: The LPA Group, Incorporated 2006

JACKSONVILLE AVIATION AUTHORITY

East Commerce Park

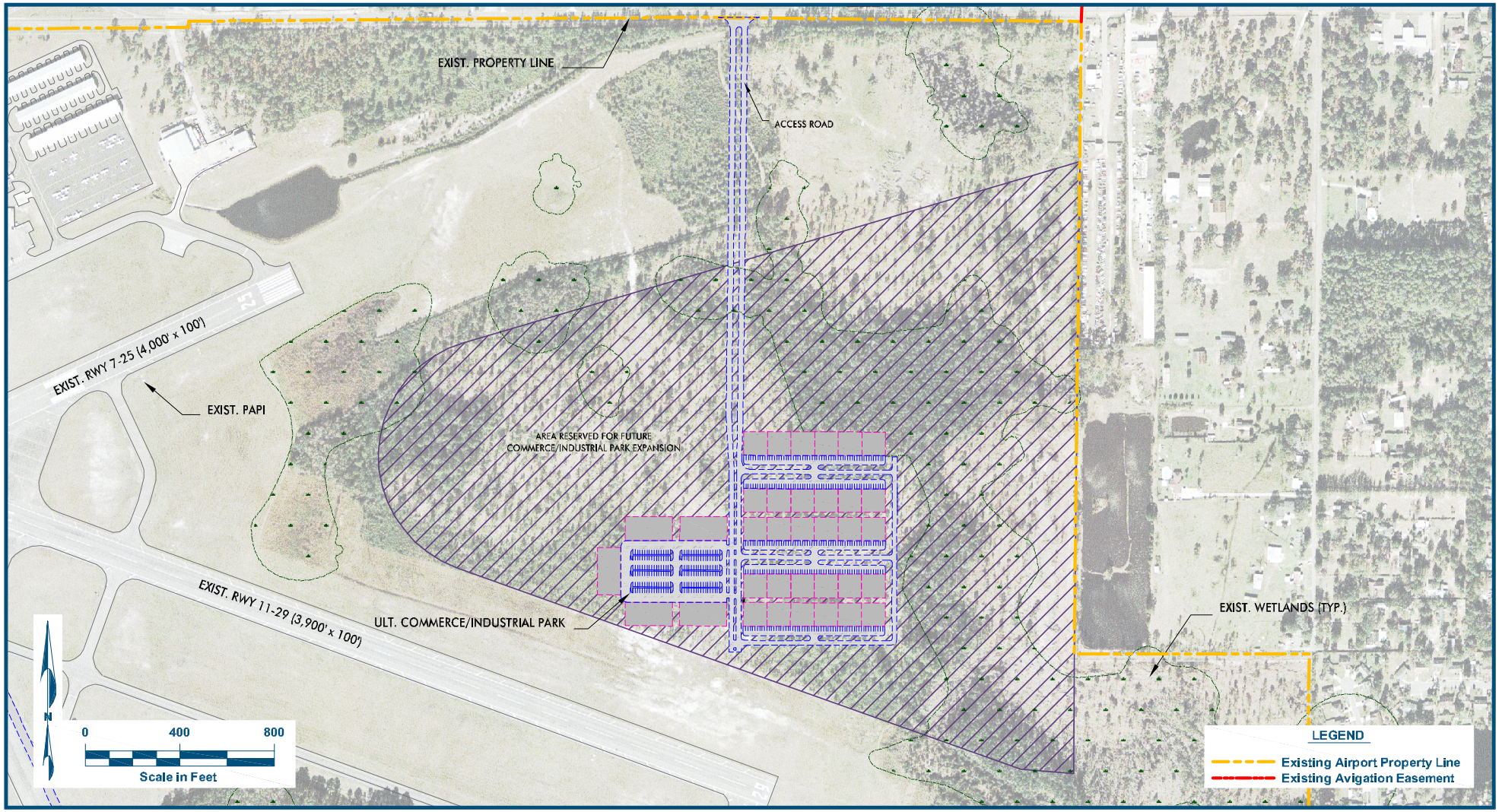

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Figure 5-14

EAST COMMERCE PARK DEVELOPMENT *Source: The LPA Group, Incorporated 2006*	
Strengths	**Weaknesses**
1. Provides an additional source of on-going revenue 2. Utilizes existing airport property 3. Provides a buffer between airport development and off-airport residential development 4. May attract both aviation and non-aviation businesses 5. Compatible Land Use with Airport Operations	1. Significant cost 2. Utilities will need to be provided 3. Will require additional fencing 4. May require wetland mitigation or Drainage Improvements 5. Will require construction of access road and site development 6. Will increase surface demand on Herlong Road.

It is recommended that JAA provide twenty-year or longer ground leases to perspective tenants in order to recoup the cost of preliminary development. Further, based upon an initial cost-benefit ratio, it is recommended that JAA not build any office or storage facilities. It is rather recommended that the owner or contractor develop the property within the criteria set by JAA and the City of Jacksonville, which requires less financial input by the Jacksonville Aviation Authority since FAA or FDOT will not pay for non-aviation related development.

South Commerce/Industrial Development

Industrial Park development as shown in **Figure 5-15** on the south side of the airfield adjacent to the Airport Perimeter Road will provide HEG another source of revenue while providing a buffer between the Airport and off-airport residential and commercial development. Proposed development consists of both aviation and non-aviation businesses.

The complex consists of an eastern, western and a southern section. The western section consists of three industrial buildings to the north and two rows of commercial use buildings to the south of these industrial buildings. The eastern section consists of two industrial buildings to the north and two rows of industrial buildings are constructed south of the north eastern industrial buildings. The southern section of the commercial/industrial complex consists of four warehousing or large commercial type buildings. Direct vehicular access to the industrial/commercial complex from the west is provided via the west access road and vehicular access from the east is provided via the east-west road to the north of

the complex. A dedicated truck route provides tractor trailers access to the loading docks to the rear of the four large buildings in the southern development. Parking for the tenants and employees of the commercial and industrial buildings are located to the front and sides of these buildings. A large parking lot provides parking for tenants and employees of the southern portion of the complex.

Proposed Development associated with the Industrial/Commerce Park includes the following:

- Four (4) 100 foot by 200 foot industrial building
- Eight (8) 100 foot by 150 foot industrial/commercial building
- Twelve (12) 100 foot by 100 foot commercial buildings
- One (1) 100 foot by 120 foot industrial building
- Four (4) 200 foot by 240 foot commercial/warehousing buildings
- Twenty eight (28) 0.4 Acres lots
- Associated taxi lanes and automobile parking

Construction associated with proposed industrial development will include installation of a new fence line, existing fence line realignment and the installation of utilities and storm water retention facilities. Order of magnitude cost estimates in 2006 dollars are shown in **Table 5-22**.

TABLE 5-22
SOUTH INDUSTRIAL PARK DEVELOPMENT
PRELIMINARY ORDER OF MAGNITUDE COST ESTIMATES

Project Description	Estimated Cost	
4, 100 x 200-ft industrial buildings	$	1,500,000
8, 100 x 150-ft industrial/commercial buildings	$	2,000,000
12, 100 x 100-ft commercial buildings	$	2,000,000
1, 100 x 120-ft industrial building	$	1,000,000
4, 200 x 240-ft commercial/warehouse buildings	$	1,200,000
Fence line adjustment	$	15,000
Roadway improvements and associated parking, includes lighting, drainage and markings	$	2,000,000
Total Development Costs[1]	**$**	**12,629,500**

[1] *Project Costs include 20% engineering and contingency fee*

Source: The LPA Group, Incorporated 2006

Although airport industrial development along the south side of the airfield will require financial input from both JAA and FDOT to accomplish, the anticipated revenue generation associated with such development is considerable. Similarly sized airports around the U.S. have financially benefited in both the short and long-term from industrial or commerce park development. Although residential development along the south side of the airfield is a viable option, it will require JAA to seek legislative assistance since the FAA discourages "through the fence" operations. Further, JAA will need to address the issue of the Gun Club with the City of Jacksonville in order to allow residential development along the south airfield.

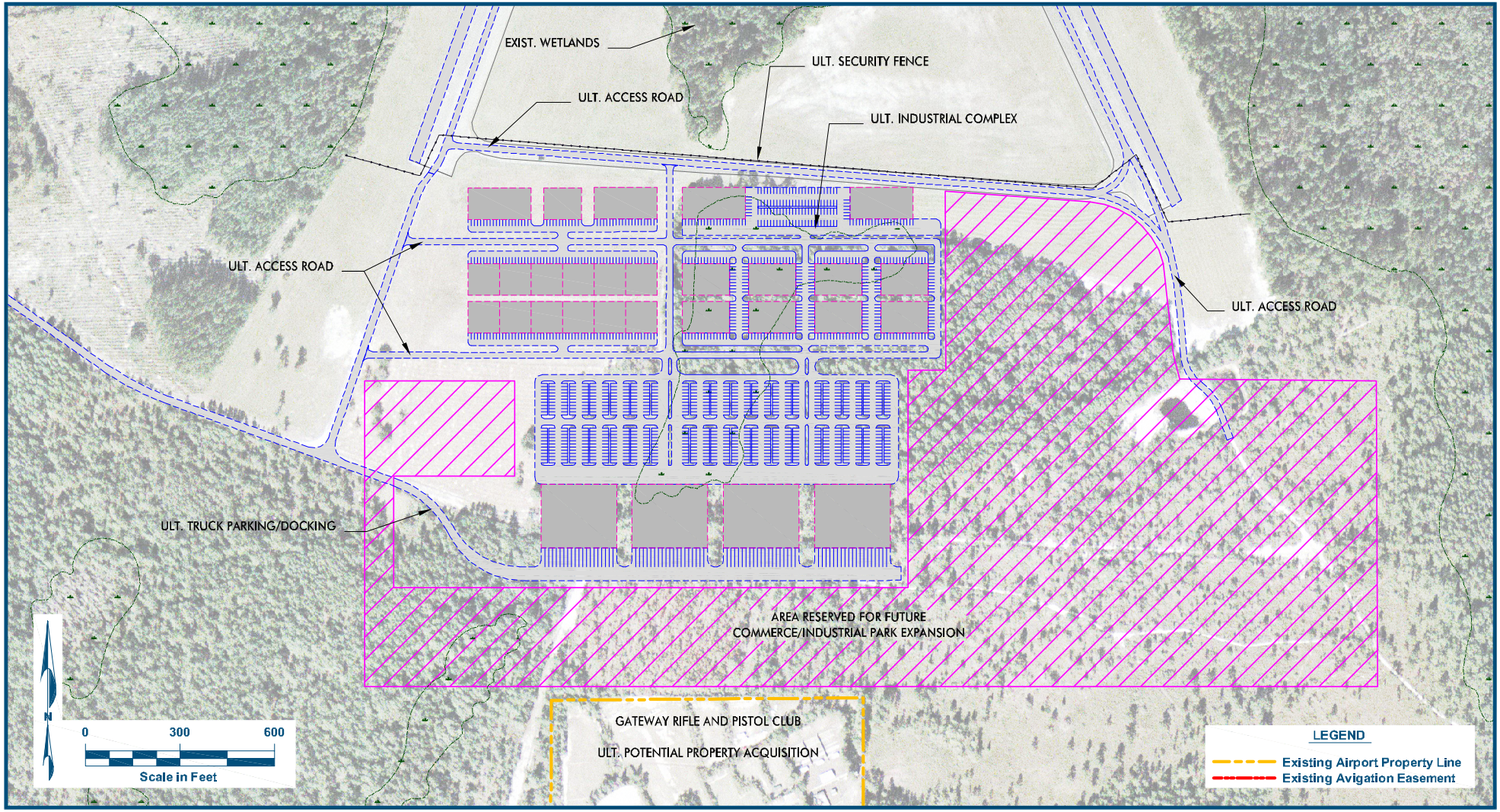
SOUTH INDUSTRIAL PARK DEVELOPMENT

Source: The LPA Group, Incorporated 2006

Strengths	Weaknesses
1. Provides an additional source of on-going revenue 2. Utilizes existing airport property 3. Provides a buffer between airport development and off-airport residential development 4. May attract both aviation and non-aviation businesses 5. Will not require relocation of Gun Club 6. Compatible Land Development	1. Significant cost (~12.6 million) 2. Utilities will need to be provided 3. Will require additional fencing 4. Drainage Improvements required 5. Will require airport perimeter road expansion and potential realignment 6. Will increase demand on Normandy Boulevard.

JACKSONVILLE AVIATION AUTHORITY

South Industrial Park



LPA

Figure 5-15

Upon review and consultation with JAA Staff, Airport Management, the TAC, FAA and FDOT as well as Public input, industrial park development was recommended. Development of an industrial park negates several of the issues associated with future development including "through the fence operations" and the location of the Gun Club. Further, industrial park development according to FAA is a compatible land use, and is anticipated to create on-going revenue streams, attract both aviation and non-aviation businesses, and provide a buffer between on- and off-airport development.

Despite interest in the development of a residential fly-in community, such a concept would decrease the property footprint and potential future developable areas at the Airport. Moreover, this concept limits revenue generation primarily to aircraft maintenance, storage and fuel sales in addition to require JAA to take legislative action to relocate the Gun Club as well as overcome FAA objections. Therefore, it is recommended that the southern development zone be reserved for future industrial and commerce park development over the twenty-year planning period.

Potential Environmental Impacts

The South Development, proposed in the southern section of the Airport contains a forested wetland and suitable gopher tortoise habitat. The proposed development will likely have impact to the forested wetland, forested upland, shrub and brushland, and associated wildlife that utilize these habitats. The proposed development has the potential to impact wading birds and other wetland dependent species. It also has the potential to impact the gopher tortoise and its habitat and trees. Based upon the results of the literature review and preliminary environmental survey, gopher tortoise and their burrows were observed at the proposed project site.

The East Commerce/Industrial Park is proposed in an undeveloped area of the Airport that contains forested wetlands and uplands. Like the South Development, proposed east side development based upon the literature review identified that plant communities in this area have a low potential to provide suitable habitat for protected species.

The West Industrial Development area is located in a disturbed area near existing wetlands and uplands. Since development has already occured contiguous to the proposed West Industrial Park parcel, based upon the literature review, limited wildlife habitats exist and existing plant species were unlikely to accommodate protected species.

Regulatory Requirements

It is anticipated that an environmental assessment will be required in conjunction with the East Commerce Park and South Industrial Park development options according to preliminary survey and literature review. Provided that suitable mitigation for the environmental impacts associated with both the south and east development is proposed then it would likely result in a Finding of No Significant Impacts (FONSI).

However, it is anticipated that the West Industrial Park development will require a Categorical Exclusion rather than an EA since proposed development is already located on disturbed soil which is not conducive habitat for protected species.

State and Federal Permits

An ERP is required to meet stormwater runoff treatment, water quality, and wetland protection regulations. The ERP application also serves as an application for a COE Section 404 permit.

Should the results of the environmental assessment determine the presence of gopher tortoise and their habitat or the presence of other protected species, species-specific surveys maybe required to meet federal and state protected species regulatory requirements. Mitigation and permits maybe required to compensate for impact to protected species by the United States Fish and Wildlife Service (FWS) for federally protected species. Similarly, permits and mitigation maybe be required by the Florida Fish and Wildlife Conservation Commission (FWC) for state protected species.

An ERP permit would be required to meet stormwater runoff treatment, water quality, and wetland protection regulations. The ERP application also serves as an application for a COE Section 404 permit.

Should the results of the environmental assessment determine the presence of protected species within the proposed development area then species-specific surveys maybe be required to meet federal and state protected species regulatory requirement. An FWC permit and mitigation maybe required in order to compensate for impacts to state protected species and an FWS permit and mitigation maybe required to compensate for impacts to federally protected species.

City of Jacksonville Concurrency

Based upon information obtained from the City of Jacksonville's Planning Department, portions of Herlong Road and Normandy Boulevard exceed their current capacity based upon existing and planned

development. Therefore, action is being taken by the City to improve overall capacity in an effort to alleviate congestion and accommodate growth within the west region of Jacksonville. Since members of the City of Jacksonville participated in the development of the preferred alternative, it was recommended that JAA work with COJ to reserve capacity on both Normandy and Herlong to accommodate mid and long-term demand. In an effort to accommodate future demand, it is recommended that prior to development of the commerce and industrial parks that a roadway study be performed prior to design. This will allow both the City of Jacksonville and JAA to address future demand in and around the airport facilities.

SUPPORT FACILITIES

Support facilities are based upon the recommended Airfield Alternative development in relation to airside and landside requirements. Components of the support facilities identified for development at HEG are described in the following.

Roadways, Ground Access and Signage

With the development of the Midfield and South Side complexes, ground access to these areas from major highways and arterial roadways will be critical for their expansion. Proposed roadway connectors to the Midfield hangar/FBO area include connecting existing roadway infrastructure with Normandy Boulevard via the South Development area, which can be accessed directly from a dedicated roadway. Associated roadway signage complementary to these developments will be provided.

Airport Maintenance Hangar

The aircraft maintenance facility for the storage of airport support vehicles, including mowers and other equipment, is to be located adjacent to the terminal facilities between the washrack and self-fueling facility within fenced area adjacent to terminal building. It is estimated that this facility will be approximately 60 x 100 feet.

Security and Fencing

Existing portions of the airfield periphery are currently unsecured in terms fencing. Adequate airfield perimeter fencing ensures that only airport employees and other authorized personnel have access. Those areas of airport property that currently lie within dense forest areas on the southeast side of the airfield may not be able to be fully fenced due to topographical constraints. Consequently, circuitous

fencing around these areas should be considered.

Fuel Storage

Existing fuel storage facilities are underground tanks located adjacent to the terminal facilities near the terminal automobile parking. It is the intent of the airport management to relocate fuel facilities east of the terminal facility adjacent to the northeast ramp to facilitate operations.

Electrical Vault

The electrical vault provides an access point into which airfield lighting, signage, navigational aids and other essential equipment are connected. The existing electrical vault, located on the north side of the airfield adjacent to the west apron, is insufficient to support development in the midfield and southern portions on the airfield. In addition as part of proposed development, the location of the electrical vault is located with the taxilane object free area. Therefore as part of airfield development, the electrical vault, non-directional beacon and AWOS are recommended for relocation.

Air Traffic Control Tower

As stated earlier, HEG is an uncontrolled airfield since it does not have an FAA or contract control tower. Typically, a contract ATCT is warranted when there are significant operations and mix of operations and is based upon a cost-benefit ratio. The Federal Contract Tower (FCT) program provides air traffic control services to FAA Level I VFR towers. A Level I tower has an approximate traffic density of 0 to 34.99 operations an hour. Services provided by an FCT are identical to those provided by an FAA-staffed tower. However, unlike Federal ATCTs, the Airport Sponsor is responsible for the funding and construction of the ATCT facility. Proposed locations for an ATCT at HEG include:

- Adjacent to the Midfield Development Area – this site provides a centralized location for monitoring all runway operations, including ramp movements, as well as activity on the more distant Runway 11-29.

- On or Near the Existing Terminal Building – this location provides adjacency benefits to most of the airport's larger aircraft operations, but is distant from operations occurring on Runway 11-29.

- Adjacent to the North Landside Development Area – similar to the adjacency benefits previously mentioned, a control tower situated near the North Landside Development Area may cause line-of-site issues resulting from the new hangar development.

Herlong Airport's candidacy for a control tower would require a series of further analyses including a separate Cost/Benefit Analysis and if warranted, a tower sighting study. However, the need for a tower will ultimately justify the means for constructing one, either contract or FAA. As such, further investigation apart from this master plan update will need to be conducted into the feasibility of a control tower at HEG.

CONCLUSIONS

The Airport development plans described above outline the necessary development and facility improvements to not only meet the forecast demand presented in **Chapter 4**, but to ultimately ensure competitiveness and financial viability of the Airport, and provide the Airport and surrounding community with the greatest overall benefit considering the goals of the HEG.

The process utilized in assessing airside and landside development concepts involved an analysis of long-term requirements and growth potential. Current Airport design standards were reflected in the analysis of runway and taxiway needs, with consideration given to the safety areas required by the FAA in runway approaches. As design standards are further modified in the future, revisions may need to be made in the plan, which could affect future development options.

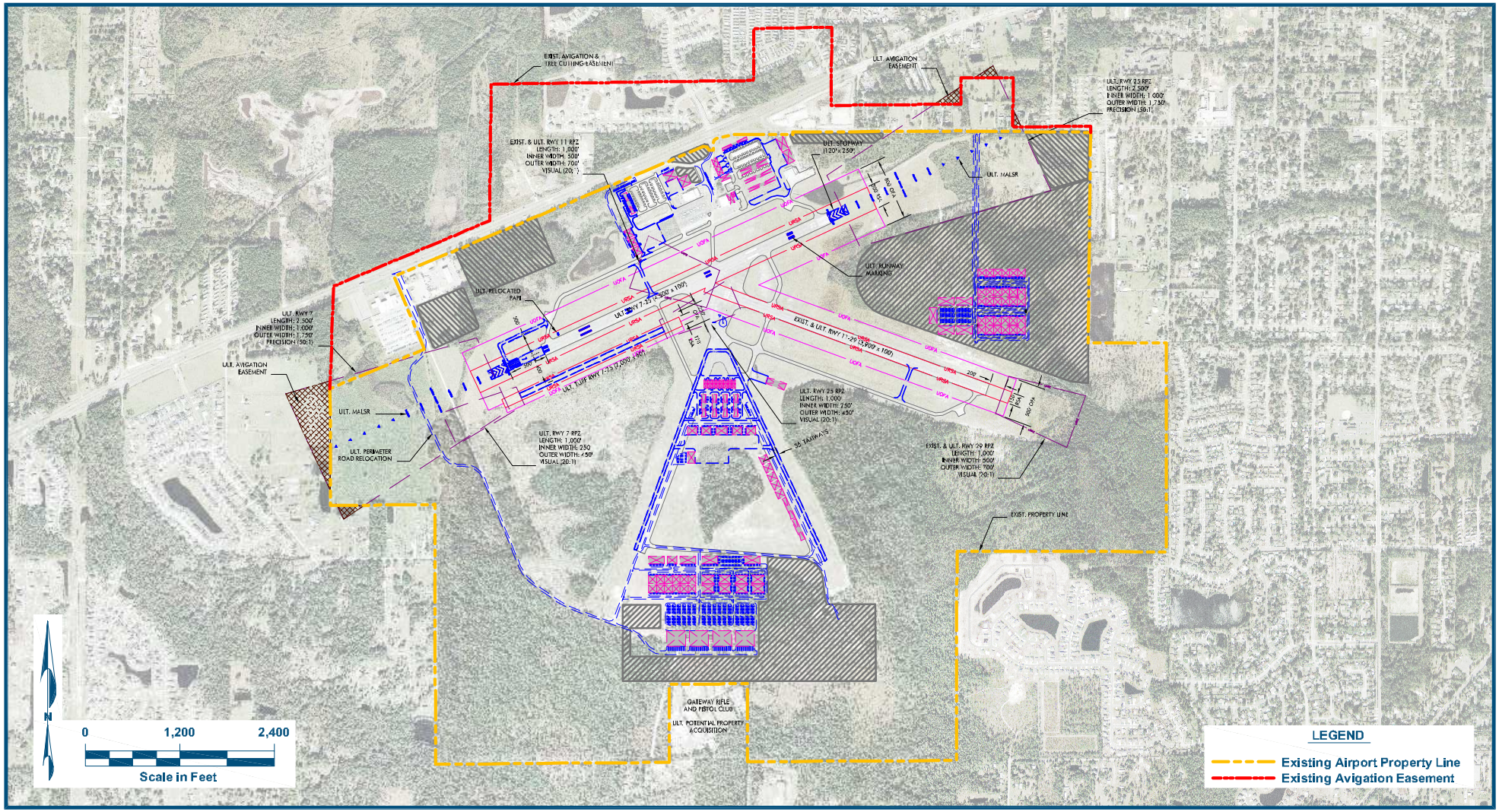
Although an ILS system was recommended as part of the airfield development, discussions with FAA revealed that support of ILS systems is waning as a result of new technology. Thus, in order to provide the option for a precision instrument approach, a Lateral Performance with Vertical Guidance (LPV) approach is recommended for Runway 25 due to wind and existing traffic patterns. LPV approaches are designed to fully exploit the tighter satellite signal protection limits from the Wide Area Augmentation Systems (WAAS). This approach combines the LNAV/VNAV vertical accuracy with lateral guidance similar to the typical Instrument Landing System. The use of LPV approaches capitalizes on the inherent accuracy of the WAAS signal and will result in lower approach minimums. There are currently seven LPV approach locations in the U.S., and production will continue until all qualified (based upon visibility minimums and operational requirements) airports have an LPV approach at each runway end. An LPV approach requires high intensity runway lighting and a MALSR to allow the approach visibility to decrease to less than 3/4 statute mile.

In addition, the use of an LPV system rather than the traditional ILS system provides the airport with greater flexibility and does not require the relocation of the airport perimeter road since no ground equipment other than the MALSRs are required.

Also at the time of this writing, airport management has received interest from private parties regarding development of a Blimp Hangar at HEG. As a result, the recommended development shows a 20,000 SF (80 x 250 foot) and 25 foot high storage hangar and 2,569 SY (23,119 sf) apron between Taxiway D and ultimate Taxiway G. Access to the airfield would be provided via Taxiway C. Since this location was determined to be dry with no evident environmental impacts, the airport or user has the option of expanding the facilities southeast to run parallel to Taxiway D. **Figure 5-16** provides a graphical presentation of the recommended development over the twenty year planning period.

JACKSONVILLE AVIATION AUTHORITY

Preferred Overall Development



LPA

Figure 5-16

However, as any good long-range planning tool, the final master-planning concept should remain flexible to unique opportunities that may be presented to the Airport. It should also be kept in mind that changes in market conditions such as changes in operations or fleet mix may dictate the acceleration or delay of projects.

The remaining portions of the Master Plan will be directed towards the preparation and phasing of a detailed implementation program, and an evaluation of funding options currently available to the HEG. A detailed review of the projects, including construction costs and phasing, is provided in **Chapter 7**, Implementation Plan.

CHAPTER SIX
Airport Layout Plan

The Airport Plans set is at the heart of the master plan document. The updated information presented in this Master Plan report is pictorially summarized in the set of drawings that make up the Airport Plans set. Major improvements outlined in the preferred concepts for land use, GA terminal area, and other major functional areas on the Airport are incorporated into the updated Airport Layout Plan (ALP). The ALP presents a group of drawings that serve as the primary tool to guide growth at HEG for the 20-year planning period and beyond. The various drawings depict the recommendations contained within this Master Plan Update with regard to aviation development for the short-, intermediate-, and long-term at the Airport.

In order to provide uniformity in the development of the Airport Plans set and to simplify agency review of the documents, the Federal Aviation Administration (FAA) requests that planners follow a general format for the presentation of specified information. The recommended format is outlined in the FAA **Advisory Circular (AC) 150/5070-6B, "Airport Master Plans"** and **AC 150/5300-13 Change 10, "Airport Design."** The ALP set for Herlong Airport was prepared in conformance with FAA established criteria.

The ALP set includes the following individual drawing sheets:

- Cover Sheet (Sheet 1)
- Airport Layout Plan Set (Sheet 2)
- Data Sheet (Sheet 3)
- General Aviation Terminal Area Drawing (Sheet 4)
- Inner Portion of Runway 7/25 Approach Surface Drawing (Sheet 5)
- Inner Portion of Runway 11/29 Approach Surface Drawing (Sheet 6)
- Inner Portion of Runway 7U/25U (Turf Runway) Approach Surface Drawing (Sheet 7)
- Airport Airspace Drawings (Sheets 8)
- On-Airport Land Use Plan (2005 Noise Contour) (Sheet 9)
- On-Airport Land Use Plan (2025 Noise Contour) (Sheet 10)
- Airport Property Map (Sheets 11 and 12)

Additionally, both a location and a vicinity map of the airport are incorporated onto the title sheet, which also provides an index on individual drawing sheets. These drawings are developed and produced as a set on 24" by 36" using AutoCAD 2006 from an Aerial Photo, and NAD 83 and NAVD 88 survey data. Reduced reproductions of the drawings are included in this chapter herein for illustration purposes. The drawings included in this chapter are for review and decision making purposes. A full-size set of the drawings will be submitted to the FAA for approval. An approved ALP is perhaps the single most

important planning tool for an airport. The drawings provide the airport management with an overall guidance on the direction for future development possibilities, given existing external constraints on a particular airport.

COVER SHEET

Sheet 1 serves as the ALP drawing set cover and provides basic information required under the FAA ALP guidelines. Information to be provided on the Title Sheet includes the project name, federal and state grant numbers, associated City and State, sponsor name and logo, and the party responsible for preparing the ALP set.

AIRPORT LAYOUT DRAWING

The ALP drawing as shown in **Sheet 2**, and depicts all existing facilities as well as proposed developments, to scale, over the 20-year master planning time period. It provides clearance and dimensional information required to show conformance with applicable FAA design standards. The ALP also reflects changes in the physical features on the Airport and critical land use changes near the Airport that may impact navigable airspace or the ability of the Airport to operate. The features of the ALP include, but are not limited to: runways, taxiways, hold aprons, lighting, navigational aids, terminal facilities, hangars, other airport buildings, aircraft parking areas, automobile parking, and airport access elements.

Key dimensional criteria are included for the airfield geometry. This includes, but is not limited to, the size of the runways and various taxiways, runway safety areas and runway object free areas, building restriction lines, and navigational aid critical areas, and other dimensional data recommended by the FAA. Airport coordinates, runway end elevations, runway high and low points, true azimuths for each runway, are also included on the drawing set.

Included on the ALP sheet are various data tables required in the FAA checklist. These tables include: Airport Data Table and Runway Data Table, Building Data Table. In addition to the tables, this sheet contains the IFR, VFR, and All-Weather Windroses and wind data tables.

Based upon discussions with the Jacksonville Aviation Authority (JAA), major airfield improvements include an extension to Runway 7-25 and associated pavement overruns, development of a 2,000-foot parallel turf runway, the conversion of the closed runways to taxiways, as well as pavement extensions to Taxiways A and E. In addition, a number of aviation storage and business facilities are recommended including T-Hangar, box, corporate and conventional hangar development, as well as non-aviation development including a commerce park and industrial park. Due to environmental and terrain issues, the turf runway is recommended to be constructed at a centerline to centerline separation of 400 feet. As a result, a modification to design standards was requested.

GENERAL AVIATION TERMINAL AREA DRAWING

The terminal area plan for Herlong Airport has been updated to reflect existing and future proposed development of terminal area and general aviation needs as identified in previous chapters of this study. The Terminal Area drawing graphically depicts the recommendations relating to the development of the airport GA terminal area, including apron parking facilities, aircraft storage, expansion of the Airport Terminal Facilities and the construction of an airport storage/maintenance area.

Sheet 4 shows the existing and long-term development plan for this area based in the improvements proposed on the ALP sheet. The terminal concept focuses on development of general aviation facilities over the 20-year planning period.

INNER APPROACH ZONE PROFILES

The RPZ and Approach Profile drawing shows both plan and profile views for each runway's RPZ and approaches as shown on the ALP. The purpose of these plans is to locate and document existing objects, which represent obstructions to navigable airspace and the existing and proposed approach slopes for each runway. Additionally, the drawing shows the ground profile and terrain features along the extended centerline at each runway end. The Inner Portion of the Approach Surface Drawings for Runways 7, 25, 11, 29, 7U and 25U are shown in **Sheets 5, 6 and 7**, respectively. Since HEG is not equipped with an air traffic control tower, the centerline separation between the primary runway and proposed turf runway (7U/25U) was increased to 700 feet, which allows each runway to operate independently.

A GPS instrument approach is recommended for both Runway 25 and 7. Obstructions to the inner approach surface of each runway have been identified as trees, which are recommended to be cut down or removed to accommodate the approach. In addition, approach and departure procedures related to Runway 7 will also likely require coordination with the FAA to limit potential airspace conflicts with Cecil Airport.

AIRPORT AIRSPACE DRAWING

The Airport Airspace Drawing reflects obstructions affecting navigable airspace as defined in Federal Aviation Regulations (FAR) Part 77. Part 77 was adopted by the FAA to enhance the safe operation of aircraft in the airspace around an airport**. Sheet 8** illustrates the airspace contours consistent with the imaginary surfaces as defined above. These contours are shown in 50-foot intervals as denoted on the plan sheets. Subpart C of FAR Part 77 establishes standards for determining obstructions to air

navigation. These regulations enable the establishment of imaginary surfaces, which no object, manmade or natural, should penetrate. FAR Part 77 surfaces are utilized in zoning and land use planning adjacent to an airport to protect the navigable airspace from encroachment by hazards that would potentially affect the safety of airport operations.

The FAR Part 77 Imaginary Surfaces Plan depicts the physical features of the area around the airport including existing obstructions that penetrate the surfaces. The specific imaginary surfaces, which should be protected from obstructions, include:

Primary Surface - A rectangular area symmetrically located about each runway centerline and extending a distance of 200 feet beyond each runway threshold. Width of the Primary Surface is based on the type of approach a particular runway has, while the elevation is the same as that of the runway centerline at all points.

Horizontal Surface – A level oval-shaped area situated 150 feet above the airport elevation, extending 5,000 or 10,000 feet outward, depending on the runway category and approach procedure available.

Conical Surface - Extends outward for a distance of 4,000 feet beginning at the outer edge of the Horizontal Surface, and sloping upward at a ratio of 20:1.

Approach Surfaces - These surfaces begin at the end of the Primary Surface (200 feet beyond the runway threshold) and slope upward at a ratio determined by the runway category and type of approach available to the runway. The width and elevation of the inner end conforms to that of the Primary Surface while approach surface length and width of the outer end are governed by the runway category and approach procedure available.

Transitional Surface - A sloping area beginning at the edges of the Primary and Approach Surfaces and sloping upward and outward at a ratio of 7:1 until it intersects the Horizontal Surface.

AIRPORT LAND USE DRAWING

The land use drawing depicts the existing and recommended use of the land on and in the immediate surroundings of the airport. The land uses shown on the plan were developed from data gathered from the most recent Master Plan Update as well as discussions with the Jacksonville Aviation Authority and the City of Jacksonville Planning Department. In addition, the drawings consider the land use controls in the 60 to 65 LDN contour based upon the current rewrite of the City of Jacksonville Zoning Code. This information has been utilized to develop the future land use of property within the airport environs and to minimize the need for future land acquisitions and easements.

The land use drawings, **Sheets 9 and 10**, depict the existing and future land use of all land in and within the vicinity of the Airport. The utilization of this land is represented by several use categories, including aviation, non-aviation, industrial and Commerce Park, which are labeled in the legend of each drawing. The land use plans have been developed through coordination with the City of Jacksonville to include existing city plans and ensure accuracy. Additionally, the existing (2005) and future (2025) noise contours (60, 65, 70 and 75 DNL) as provided in **Appendix D**, *Airport Noise Analysis*, have been superimposed on **Sheets 8 and 9**, respectively. This will give local authorities guidance and help to ensure appropriate aviation-compatible zoning is maintained in the future.

AIRPORT PROPERTY MAP

The Airport Property Map (previously referred to as Exhibit A) defines the existing and recommended future airport boundary for HEG in a graphical and tabular form. The purpose of the drawing, as shown in **Sheets 11 and 12**, provides information necessary to analyze the current and future use of land acquired with federal funds. The existing and recommended future airport property line is also identified. The property map also identifies contiguous property. However, based upon recommended development and future noise contours, acquisition of property other than for avigation easements related to the instrument approaches to Runway 25 and 7 is not required.

For reference, major airport facilities, both existing and proposed, are presented in the background. Known metes and bounds data is depicted, but have not been field verified as part of this study.

SUMMARY

The Airport Plans Set is intended to depict in graphical format the airport's capital development program. Preliminary plans were presented to the Jacksonville Airport Authority and airport management staff for discussion and review. Based upon discussions with the Technical Advisory Committee, City of Jacksonville Planning Department and JAA staff, recommended development was incorporated into the airport plans set to reflect development over the twenty-year planning period.

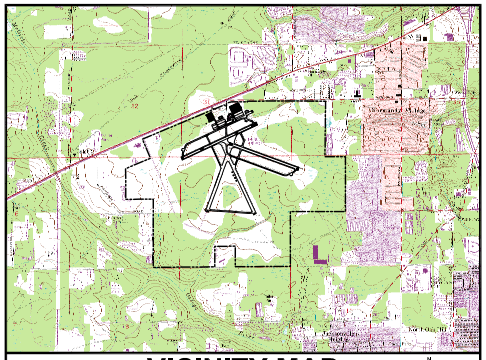
HERLONG AIRPORT
JACKSONVILLE, FLORIDA

MASTER PLAN UPDATE

LOCATION MAP
SCALE: 1 INCH = 12 MILES

Index To Drawings

Drawing No.	Description
1	COVER
2	AIRPORT LAYOUT DRAWING
3	DATA SHEET
4	TERMINAL AREA DRAWING
5	INNER PORTION OF RUNWAY 7/25 APPROACH SURFACE DRAWING
6	INNER PORTION OF RUNWAY 11/29 APPROACH SURFACE DRAWING
7	INNER PORTION OF TURF RUNWAY 7U/25U APPROACH SURFACE DRAWING
8	AIRPORT AIRSPACE DRAWING
9	ON-AIRPORT LAND USE PLAN (2005 NOISE CONTOUR)
10	ON-AIRPORT LAND USE PLAN (2025 NOISE CONTOUR)
11-12	AIRPORT PROPERTY MAP



VICINITY MAP
SCALE: 1 INCH = 3,000 FEET

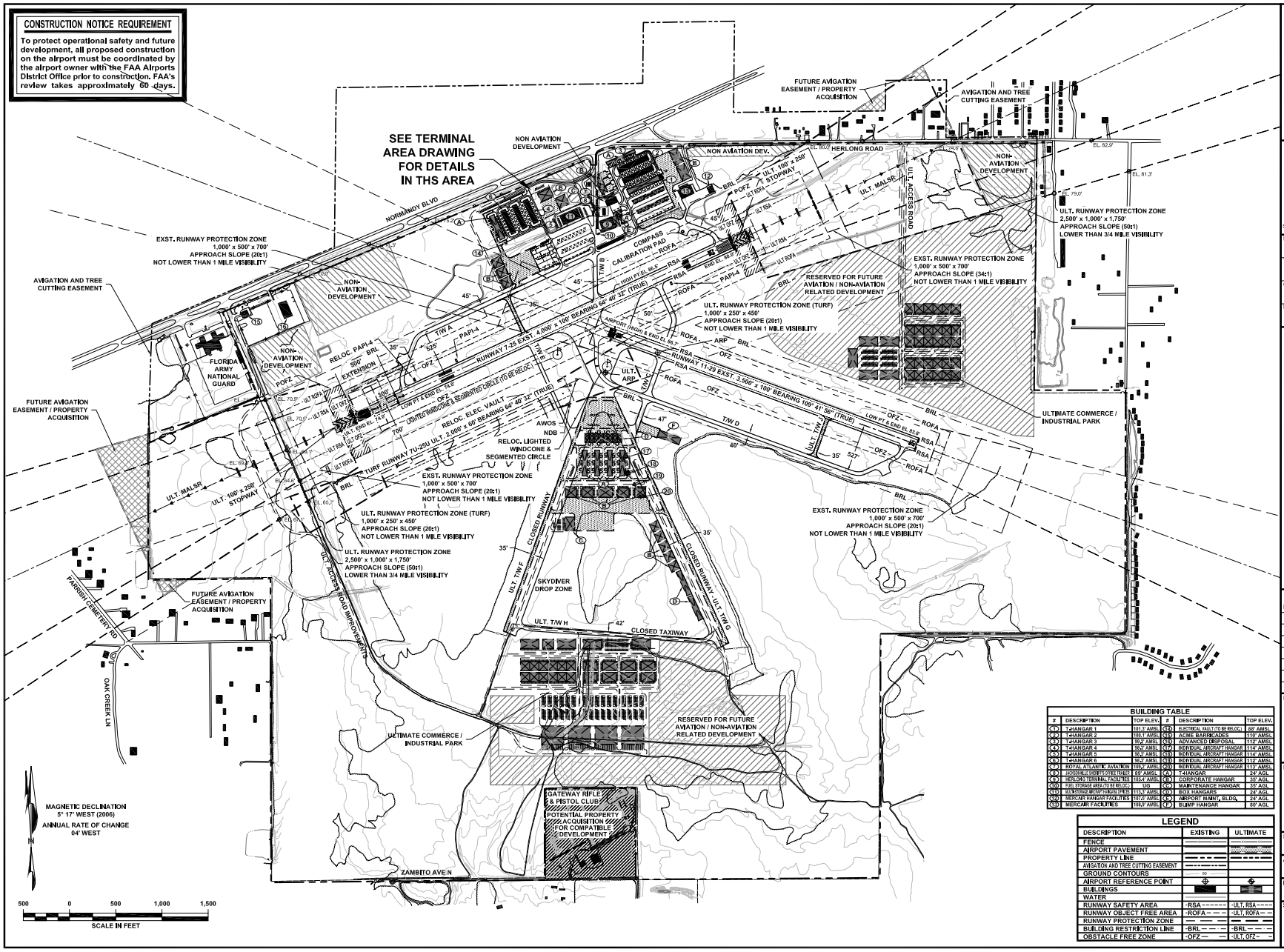
JACKSONVILLE
AVIATION AUTHORITY

MARCH 2008

PREPARED BY:

THE LPA GROUP INCORPORATED
Aviation Consultants

ATLANTA, GA • BATON ROUGE, LA • CHARLESTON, SC • CHARLOTTE, NC • COLUMBIA, SC
GREENSBORO, NC • JACKSONVILLE, FL • KNOXVILLE, TN • LITTLE ROCK, AR • MOBILE, AL • ORLANDO, FL
RALEIGH, NC • SARASOTA, FL • TALLAHASSEE, FL • TAMPA, FL • WEST PALM BEACH, FL



BUILDING TABLE					
#	DESCRIPTION	TOP ELEV.	#	DESCRIPTION	TOP ELEV.
1	T-HANGAR 1	101.3' AMSL	15	ELECTRICAL VAULT (TO BE RELOC.)	88' AMSL
2	T-HANGAR 2	105.1' AMSL	16	ACME BARRICADES	110' AMSL
3	T-HANGAR 3	99.2' AMSL	16	ADVANCED DISPOSAL	112' AMSL
4	T-HANGAR 4	99.2' AMSL	17	INDIVIDUAL AIRCRAFT HANGAR	114' AMSL
5	T-HANGAR 5	99.2' AMSL	18	INDIVIDUAL AIRCRAFT HANGAR	114' AMSL
6	T-HANGAR 6	99.2' AMSL	19	INDIVIDUAL AIRCRAFT HANGAR	112' AMSL
7	ROYAL ATLANTIC AVIATION	105.2' AMSL	20	INDIVIDUAL AIRCRAFT HANGAR	113' AMSL
8	JACKSONVILLE HELICOPTER TAXI	89' AMSL	A	T-HANGAR	24' AGL
9	HERLONG TERMINAL FACILITIES	103.4' AMSL	B	CORPORATE HANGAR	35' AGL
10	FUEL STORAGE AREA (TO BE RELOC.)	UG	C	MAINTENANCE HANGAR	35' AGL
11	ELEVATED MESOPTIMIZING TANK	113.3' AMSL	D	BOX HANGARS	24' AGL
12	MERCAIR HANGAR FACILITIES	107.5' AMSL	E	AIRPORT MAINT. BLDG.	24' AGL
13	MERCAIR FACILITIES	106.9' AMSL	F	BLIMP HANGAR	80' AGL

LEGEND		
DESCRIPTION	EXISTING	ULTIMATE
FENCE		
AIRPORT PAVEMENT		
PROPERTY LINE		
AVIGATION AND TREE CUTTING EASEMENT		
GROUND CONTOURS	80	
AIRPORT REFERENCE POINT		
BUILDINGS		
WATER		
RUNWAY SAFETY AREA	-RSA-	-ULT. RSA-
RUNWAY OBJECT FREE AREA	-ROFA-	-ULT. ROFA-
RUNWAY PROTECTION ZONE		
BUILDING RESTRICTION LINE	-BRL-	-BRL-
OBSTACLE FREE ZONE	-OFZ-	-ULT. OFZ-

JACKSONVILLE AVIATION AUTHORITY
HERLONG AIRPORT
JACKSONVILLE, FLORIDA

THE LPA GROUP
TRANSPORTATION CONSULTANTS
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GREENSBORO, NC • JACKSONVILLE, FL • KNOXVILLE, TN
MOBILE, AL • ORLANDO, FL • RALEIGH, NC • RICHMOND, VA
SARASOTA, FL • TALLAHASSEE, FL • TAMPA, FL • WEST PALM BEACH, FL

Designer: TGM	APPROVALS
Technician: TGM	JACKSONVILLE AVIATION AUTHORITY BY: TITLE: DATE:
Checked by: TF	FLORIDA DEPARTMENT OF TRANSPORTATION BY: TITLE: DATE:
Project Number: PL502022	

NOTES

1. ALL EXISTING HOLDING POSITION MARKINGS FOR RUNWAY/TAXIWAY INTERSECTIONS ARE 125' FROM RUNWAY CENTERLINE AND PERPENDICULAR TO TAXIWAY CENTERLINE. ALL ULTIMATE HOLDING POSITION MARKINGS FOR RUNWAY/TAXIWAY INTERSECTIONS ARE 125' FROM RUNWAY CENTERLINE AND PERPENDICULAR TO TAXIWAY CENTERLINE.
2. COORDINATES SHOWN HEREON ARE IN NAD83.
3. ELEVATIONS SHOWN HEREON ARE IN NAVD88 AND ARE ABOVE MEAN SEA LEVEL (AMSL).
4. SEE AIRPORT PROPERTY MAP FOR PROPERTY LINE METES AND BOUNDS.
5. NO OFZ OBJECT PENETRATIONS.
6. NO THRESHOLD SITING PENETRATIONS.
7. THE ARROWHEADS PRECEDING RUNWAY 11 THRESHOLD ARE CURRENTLY PAINTED WHITE AND SHOULD BE PAINTED YELLOW, BECAUSE RUNWAY 11 DOES NOT HAVE A DISPLACED THRESHOLD, BUT HAS A TAXIWAY PRECEDING THE RUNWAY.
8. SEE DRAWING 8, AIRPORT PROPERTY MAP, FOR COMPLETE AIRPORT PROPERTY, EASEMENT, AND RUNWAY PROTECTION ZONE BOUNDARIES.
9. THE BRL IS DETERMINED BY THE TAXIWAY OFA FOR THE PARALLEL TAXIWAYS AND THE CLEARANCE OF A 20 FOOT TALL OBJECT ON THE OPPOSITE SIDE.

REVISIONS

No.	Description	Date	By

Project Name: MASTER PLAN UPDATE

Drawing Name: AIRPORT LAYOUT DRAWING

FAA A.I.P. Project Number:

Autocad Drawing Reference:

Date:	Division:
MARCH 2008	PLANNING
Scale: 1" = 500'	Drawing Number: 2

RUNWAY DATA

STAGE		EXISTING		ULTIMATE		ULTIMATE		EXISTING		ULTIMATE	
RUNWAY		7	25	7	25	TURF 7U	TURF 25U	11	29	11	29
RUNWAY LENGTH		4,000'	4,000'	4,500'	4,500'	2,000'	2,000'	3,500'	3,500'	NO CHANGE	NO CHANGE
DISPLACED THRESHOLD		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NO CHANGE	NO CHANGE
TORA		N/A	N/A	4,500'	4,500'	N/A	N/A	N/A	N/A	NO CHANGE	NO CHANGE
TODA		N/A	N/A	4,500'	4,500'	N/A	N/A	N/A	N/A	NO CHANGE	NO CHANGE
ASDA		N/A	N/A	4,500'	4,500'	N/A	N/A	N/A	N/A	NO CHANGE	NO CHANGE
LDA		N/A	N/A	4,750'	4,750'	N/A	N/A	N/A	N/A	NO CHANGE	NO CHANGE
RUNWAY WIDTH		100'	100'	NO CHANGE	NO CHANGE	60'	60'	100'	100'	NO CHANGE	NO CHANGE
PAVEMENT TYPE		ASPHALT	ASPHALT	NO CHANGE	NO CHANGE	TURF	TURF	ASPHALT	ASPHALT	NO CHANGE	NO CHANGE
PAVEMENT LOADING (THOUSANDS)		S - 30	S - 30	NO CHANGE	NO CHANGE	N/A	N/A	S - 30	S - 30	NO CHANGE	NO CHANGE
RUNWAY LIGHTING		MIRL	MIRL	HIRL	HIRL	NONE	NONE	MIRL	MIRL	NO CHANGE	NO CHANGE
RUNWAY MARKINGS		NONPRECISION	NONPRECISION	PRECISION	PRECISION	N/A	N/A	BASIC	BASIC	NO CHANGE	NO CHANGE
APPROACH LIGHTING		NONE	NONE	MALSR	MALSR	NONE	NONE	NONE	NONE	NO CHANGE	NO CHANGE
TAXIWAY WIDTH		50'	50'	NO CHANGE	NO CHANGE	N/A	N/A	50'	50'	NO CHANGE	NO CHANGE
TAXIWAY LIGHTING		L, M, HITL	L, M, HITL	NO CHANGE	NO CHANGE	N/A	N/A	L, M, HITL	L, M, HITL	NO CHANGE	NO CHANGE
AIRCRAFT APPROACH CATEGORY		B	B	C	C	A	A	B	B	NO CHANGE	NO CHANGE
AIRPLANE DESIGN GROUP		II	II	NO CHANGE	NO CHANGE	I (< 12,500 LB)	I (< 12,500 LB)	II	II	NO CHANGE	NO CHANGE
CRITICAL AIRCRAFT		KING AIR 90/CITATION II	KING AIR 90/CITATION II	CITATION X	CITATION X	CESSNA 172	CESSNA 172	KING AIR 90/CITATION II	KING AIR 90/CITATION II	NO CHANGE	NO CHANGE
RUNWAY END ELEVATION (NAVD 88)		74.0' AMSL	80.0' AMSL	NO CHANGE	NO CHANGE	74.0' AMSL	79.0' AMSL	86.7' AMSL	83.8' AMSL	NO CHANGE	NO CHANGE
DISPLACED THRESHOLD ELEVATION (NAVD 88)		N/A	N/A	NO CHANGE	NO CHANGE	N/A	N/A	N/A	N/A	NO CHANGE	NO CHANGE
EFFECTIVE GRADIENT		+0.150%	-0.150%	+0.133%	-0.133%	+0.250%	-0.250%	-0.083%	+0.083%	NO CHANGE	NO CHANGE
TOUCHDOWN ZONE ELEVATION (NAVD 88)		86.5' AMSL	86.5' AMSL	NO CHANGE	NO CHANGE	N/A	N/A	86.7' AMSL	85.3' AMSL	NO CHANGE	NO CHANGE
APPROACH VISIBILITY MINIMUMS		VISUAL	1 MILE	1/2 MILE	1/2 MILE	VISUAL	VISUAL	VISUAL	VISUAL	NO CHANGE	NO CHANGE
NAVIGATIONAL AND VISUAL AIDS		PAPI-4	PAPI-4, GPS	PAPI-4, GPS, MALSR, LPV	PAPI-4, GPS, MALSR, LPV	NONE	NONE	NONE	NONE	NO CHANGE	NO CHANGE
APPROACH SLOPE		20:1	34:1	50:1	50:1	20:1	20:1	20:1	20:1	NO CHANGE	NO CHANGE
FAR PART 77 CATEGORY		B(V)	C	PIR	PIR	A(V)	A(V)	A(V)	A(V)	NO CHANGE	NO CHANGE
RUNWAY PROTECTION ZONE (RPZ)	LENGTH	1,000'	1,000'	2,500'	2,500'	1,000'	1,000'	1,000'	1,000'	NO CHANGE	NO CHANGE
	WIDTH 1	500'	500'	1,000'	1,000'	250'	250'	500'	500'	NO CHANGE	NO CHANGE
	WIDTH 2	700'	700'	1,750'	1,750'	450'	450'	700'	700'	NO CHANGE	NO CHANGE
OBJECT FREE AREA (OFA) WIDTH		500'	500'	800'	800'	250'	250'	500'	500'	NO CHANGE	NO CHANGE
OFA LENGTH BEYOND RUNWAY END		300'	300'	1,000'	1,000'	240'	240'	300'	300'	NO CHANGE	NO CHANGE
RUNWAY SAFETY AREA (RSA) WIDTH		150'	150'	400'	400'	120'	120'	150'	150'	NO CHANGE	NO CHANGE
RSA LENGTH PRIOR TO LANDING THRESHOLD		300'	300'	600'	600'	240'	240'	300'	300'	NO CHANGE	NO CHANGE
RSA LENGTH BEYOND RUNWAY END		300'	300'	1,000'	1,000'	240'	240'	300'	300'	NO CHANGE	NO CHANGE
OBSTACLE FREE ZONE (OFZ) WIDTH		400'	400'	NO CHANGE	NO CHANGE	250'	250'	400'	400'	NO CHANGE	NO CHANGE
OFZ LENGTH BEYOND RUNWAY END		200'	200'	NO CHANGE	NO CHANGE	200'	200'	200'	200'	NO CHANGE	NO CHANGE
RUNWAY END (NAD 83)	LATITUDE	30° 16' 34.91" N	30° 16' 51.84" N	30° 16' 32.79" N	NO CHANGE	30° 16' 26.53" N	30° 16' 34.99" N	30° 16' 42.08" N	30° 16' 30.38" N	NO CHANGE	NO CHANGE
	LONGITUDE	81° 48' 53.66" W	81° 48' 12.40" W	81° 48' 58.81" W	NO CHANGE	81° 48' 55.40" W	81° 48' 34.78" W	81° 48' 26.97" W	81° 48' 49.28" W	NO CHANGE	NO CHANGE
DISPLACED THRESHOLD (NAD 83)	LATITUDE	N/A	N/A	NO CHANGE	NO CHANGE	N/A	N/A	N/A	N/A	NO CHANGE	NO CHANGE
	LONGITUDE	N/A	N/A	NO CHANGE	NO CHANGE	N/A	N/A	N/A	N/A	NO CHANGE	NO CHANGE

BUILDING TABLE

EXISTING			ULTIMATE		
#	DESCRIPTION	TOP ELEV.	#	DESCRIPTION	TOP ELEV.
1	T-HANGAR 1	101.3' AMSL	A	T-HANGAR	24' AGL
2	T-HANGAR 2	100.1' AMSL	B	CORPORATE HANGAR	35' AGL
3	T-HANGAR 3	99.2' AMSL	C	MAINTENANCE HANGAR	35' AGL
4	T-HANGAR 4	98.3' AMSL	D	BOX HANGARS	24' AGL
5	T-HANGAR 5	98.3' AMSL	E	AIRPORT MAINT. BLDG.	24' AGL
6	T-HANGAR 6	98.3' AMSL	F	BLIMP HANGAR	80' AGL
7	ROYAL ATLANTIC AVIATION	109.2' AMSL			
8	JACKSONVILLE SHERIFF'S OFFICE TRAILER	89' AMSL			
9	HERLONG TERMINAL FACILITIES	105.4' AMSL			
10	FUEL STORAGE AREA (TO BE RELOC.)	UG			
11	MULTI-STORAGE AIRCRAFT HANGAR& OFFICES	113.3' AMSL			
12	MERCAIR HANGAR FACILITIES	107.5' AMSL			
13	MERCAIR FACILITIES	108.9' AMSL			
14	ELECTRICAL VAULT (TO BE RELOC.)	88' AMSL			
15	ACME BARRICADES	110' AMSL			
16	ADVANCED DISPOSAL	112' AMSL			
17	INDIVIDUAL AIRCRAFT HANGAR	114' AMSL			
18	INDIVIDUAL AIRCRAFT HANGAR	114' AMSL			
19	INDIVIDUAL AIRCRAFT HANGAR	112' AMSL			
20	INDIVIDUAL AIRCRAFT HANGAR	113' AMSL			

NOTE: NUMBERS ARE EXISTING
LETTERS ARE FUTURE

AIRPORT DATA

CITY: JACKSONVILLE COUNTY: DUVAL STATE: FLORIDA

DESCRIPTION		EXISTING	ULTIMATE
AIRPORT ELEVATION (NAVD 88)		86.7' AMSL	NO CHANGE
MEAN MAXIMUM TEMPERATURE (JULY)		92° F	NO CHANGE
MAGNETIC DECLINATION (2006)		5° 17' W	0° 4' W / YEAR
AIRPORT REFERENCE POINT (NAD 83)	LAT.	30° 16' 40.04" N	30° 16' 37.88" N
	LONG.	81° 48' 21.41" W	81° 48' 27.89" W
AIRPORT REFERENCE CODE		B II	C II
CRITICAL AIRCRAFT		KING AIR 90/CITATION II	CITATION X
AIRPORT & TERMINAL NAVAIDS		NDB, GPS, AWOS	NDB, GPS, AWOS, LPV
SERVICE LEVEL		RELIEVER	NO CHANGE

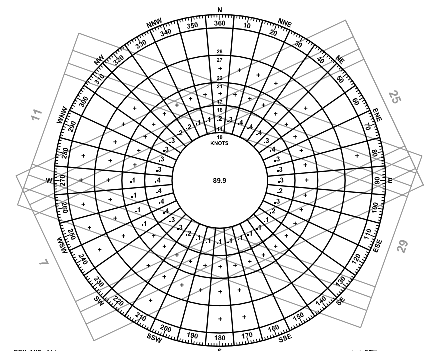
LEGEND

DESCRIPTION	EXISTING	ULTIMATE
FENCE		
AIRPORT PAVEMENT		
PROPERTY LINE		
AVIGATION AND TREE CUTTING EASEMENT		
GROUND CONTOURS	80	
AIRPORT REFERENCE POINT		
BUILDINGS		
WATER		
RUNWAY SAFETY AREA	-RSA	-ULT. RSA
RUNWAY OBJECT FREE AREA	-ROFA	-ULT. ROFA
RUNWAY PROTECTION ZONE		
BUILDING RESTRICTION LINE	-BRL	-BRL
OBSTACLE FREE ZONE	-OFZ	-ULT. OFZ

MODIFICATIONS TO STANDARDS

DESCRIPTION	CRITERIA	STANDARD	REQUESTED	EXISTING	FAA APPROVAL
N/A	-	-	-	-	-

All Weather Wind Rose

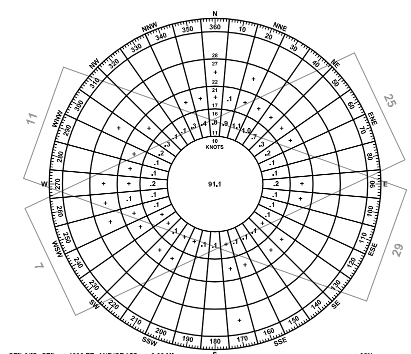


CEIL/VIS: ALL

\+ < .05%

WIND COVERAGE	12 MPH / 10.5 KNOTS	15 MPH / 13 KNOTS	18 MPH / 16 KNOTS	23 MPH / 20 KNOTS
RUNWAY 7/25	96.99%	98.67%	99.77%	99.96%
RUNWAY 11/29	95.71%	97.84%	99.59%	99.91%
TOTAL COMBINED	98.73%	99.59%	99.93%	99.99%

IFR Wind Rose



CEIL/VIS: CEIL < 1000 FT. AND/OR VIS. < 3.00 MI.

\+ < .05%

WIND COVERAGE	15 MPH / 13 KNOTS
RUNWAY 7 *	91.24%
RUNWAY 25 *	80.38%
RUNWAY 11 *	88.13%
RUNWAY 29 *	91.18%

* BASED ON A 5 KNOT TAILWIND COMPONENT

WIND COVERAGE	15 MPH / 13 KNOTS
RUNWAY 7/25	98.35%
RUNWAY 11/29	96.55%
TOTAL COMBINED	99.11%

SOURCE: NATIONAL CLIMATIC DATA CENTER
ASHEVILLE, NC

83015 OBSERVATIONS MADE
OVER THE PERIOD 1989-1998
STATION 72206 CECIL FIELD, FL, US

JACKSONVILLE AVIATION AUTHORITY
HERLONG AIRPORT
JACKSONVILLE, FLORIDA

THE LPA GROUP
TRANSPORTATION CONSULTANTS
ATLANTA, GA • BATON ROUGE, LA • CHARLESTON, SC
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GREENSBORO, NC • JACKSONVILLE, FL • KNOXVILLE, TN
MOBILE, AL • ORLANDO, FL • RALEIGH, NC • RICHMOND, VA
SARASOTA, FL • TALLAHASSEE, FL • TAMPA, FL • WEST PALM BEACH, FL

Designer: TGM
Technician: TGM
Checked by: TF
Project Number: PL502022

NOTES

REVISIONS

No.	Description	Date	By

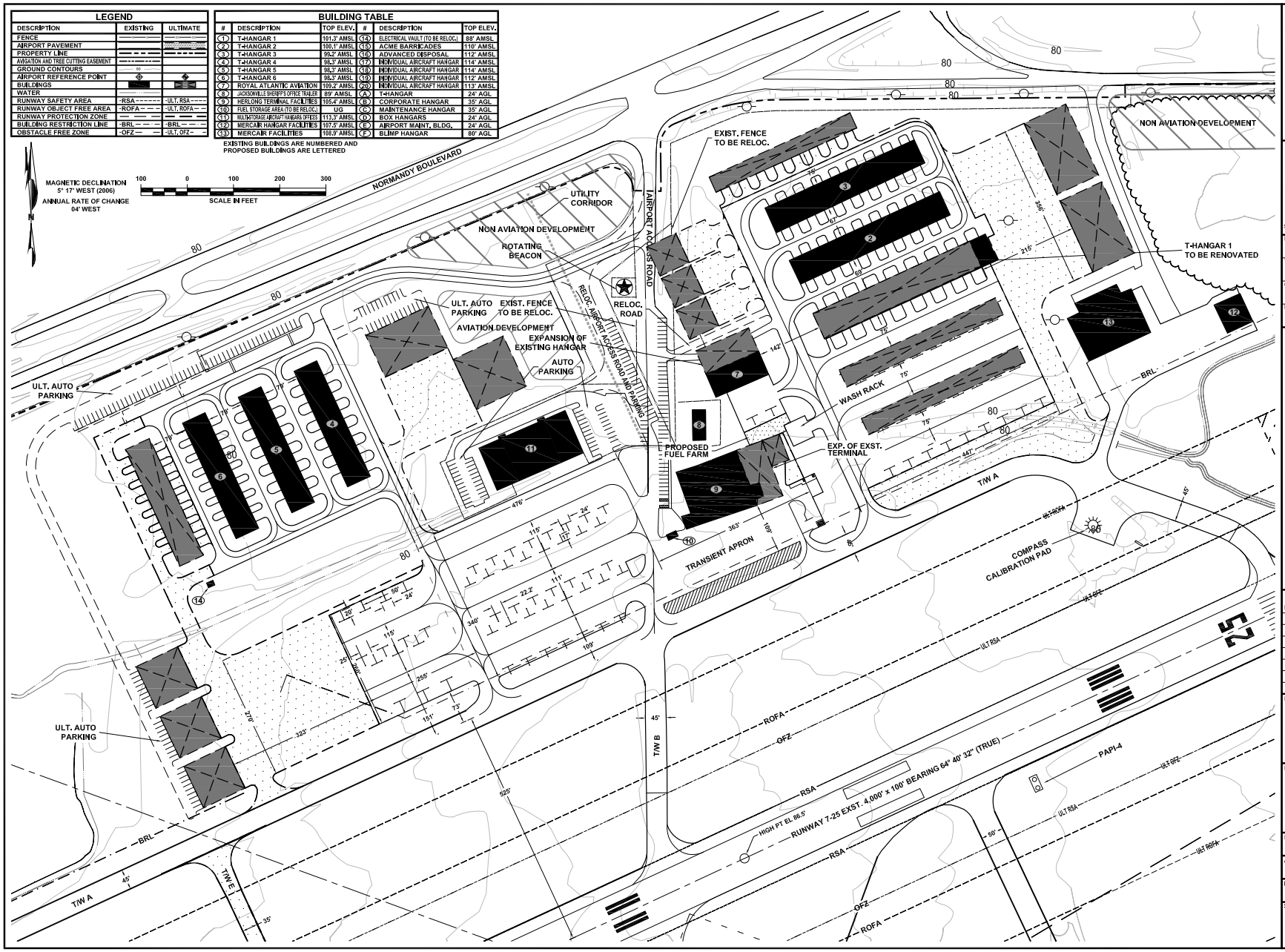
Project Name: MASTER PLAN UPDATE

Drawing Name: DATA SHEET

FAA A.I.P. Project Number:

Autocad Drawing Reference:

Date: MARCH 2008
Division: PLANNING
Scale: NO SCALE
Drawing Number: 3



JACKSONVILLE AVIATION AUTHORITY
HERLONG AIRPORT
JACKSONVILLE, FLORIDA

THE LPA GROUP
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ATLANTA, GA • BATON ROUGE, LA • CHARLESTON, SC
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SARASOTA, FL • TALLAHASSEE, FL • TAMPA, FL • WEST PALM BEACH, FL

Designer: TGM
Technician: TGM
Checked by: TF
Project Number: PL502022

NOTES

REVISIONS

No.	Description	Date	By

Project Name:
MASTER PLAN UPDATE

Drawing Name:
TERMINAL AREA DRAWING

FAA A.I.P. Project Number:

Autocad Drawing Reference:

Date: MARCH 2008
Division: PLANNING
Scale: 1" = 100'
Drawing Number: 4

ERROR: ioerror
OFFENDING COMMAND: image

STACK:

-mark-
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-mark-
-savelevel-