Master Plan Update

North Palm Beach County
General Aviation Airport
Master Plan Update

PREPARED FOR
Palm Beach County
Department of Airports
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PREPARED BY

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IN ASSOCIATION
Ricondo & Associates, Inc.

Contents

Master Plan Update

As defined by the Federal Aviation Administration (FAA) in Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, a master plan is defined as a concept for potential long-term development of an airport. It entails a series of planning steps that analyze how expected future aviation demand can best be accommodated, including a graphical representation of the findings.

The goal of a master plan is to provide solutions that will satisfy the expected future needs of an airport in a financially feasible manner, while accounting for the surrounding community, local environment, and socioeconomic factors. Additionally, because future travel demand will change over time, a master plan must allow the airport flexibility to implement different projects to meet actual demand. Airport planning begins with a careful assessment of existing facilities and current airport use, and projections of aviation demand over a specific timeframe, also known as the "planning period." The planning period here is the 20-year period **2005-2025**.

The recommendations provided in a master plan are technically sound and meet FAA standards, but are only recommendations: implementation of any projects can occur only as warranted by need. The recommendations outlined in the plan are also subject to further FAA review and environmental/feasibility studies before implementation.

Palm Beach County System of Airports

The PBC Department of Airports (DOA) owns and operates a system of four airports; Palm Beach International Airport (PBI), Palm Beach Park Airport (LNA), Palm Beach County Glades Airport (PHK) , and North Palm Beach County General Aviation Airport (F45).

PBI is the center for all commercial air carrier service into Palm Beach County, while together, LNA, PHK, and F45 accommodate most of the general aviation demand in the region. Both LNA and F45 are designated as a "reliever airport" by the FAA. As reliever airports, F45 and LNA relieve congestion at Palm Beach International Airport, by providing an alternate venue for general aviation traffic. The County chose to update all four master plans, rather than only PBI's plan, for the purpose of assuring that the relievers can continue to fulfill their missions of offloading PBI as well as meeting local general aviation (GA) demand.

Specific goals and objectives were developed as guidelines in assessing various alternatives for future development for the system of airports. The goals were identified as the following:

- Accommodate passenger demand while maintaining the highest level of customer service and convenience possible, including an emphasis on low delay and congestion levels.

- Refine and validate selected long-term airport improvements that meet forecast airline, corporate, and general aviation system demand, while providing flexibility to respond to actual demand.
- Develop an enhancement plan that meets FAA standards, is financially sound, environmentally responsible, and consistent with the County's established good neighbor programs.

F45 Executive Summary

North Palm Beach County General Aviation Airport is the youngest of the system of airports, opening its runways to general aviation pilots in the early 1990's. The DOA built F45 for the purpose of increasing the County's GA capacity, thereby also offloading PBI to the maximum extent. The airport is located off the Bee Line Highway, approximately 12 miles northwest of West Palm Beach.

Activity Forecasts, a Key Underpinning

Annual Operations

Operations forecasts dictate to a large degree the nature of the airport infrastructure required to meet the projected demand. Large numbers of "based" aircraft – aircraft that are parked or hangared generally at an airport – require apron or hangar parking, fuel and possibly some minor maintenance functions. Itinerant aircraft – those whose landing and takeoff are at different airports or which leave a 25-mile radius of the airport – require apron parking, fuel and preferably an airport restaurant or diner for the aptly-named "$100 hamburger" – the likely cost (at a minimum) when the price of fuel, landing fees and care/maintenance of a private aircraft – are factored.

Projections for this master plan reveal that activity at F45 is expected to show steady growth throughout the forecast period. As indicated in **Table ES-6,** total operations are projected to increase from a base of 69, 875 in 2004 to approximately 110,844 in 2025, an annual average rate of growth of 2.28 percent.

TABLE ES-6
Forecast of Operations, 2005-2025

Year	Local Operations	Itinerant Operations	Total Operations	Annual Percent Change	Operations per Based Aircraft	Annual Percent Change
Base Year						
2004	22,360	47,515	69,875	-	325	-
Forecast						
2005	22,672	48,178	70,850	2.28	325	0.0
2010	25,094	53,325	78,419	2.28	328	0.18
2015	28,162	59,845	88,007	2.28	331	0.18
2020	31,606	67,162	98,768	2.28	334	0.18
2025	35,470	75,374	110,844	2.28	337	0.18

Source: Ricondo & Associates, Inc.

Peak Activity

Airport traffic displays peaking characteristics by month of year, day of week, and hour of day. Because there is no base of accurate historic traffic data available, a key assumption is made that **activity levels at F45 are fairly well spread out throughout the year**. At most airports, between 9 and 12 percent of annual operations occur in the busiest month. An average of 10 percent is assumed and applied to the projected annual operations through the year 2025.

The average daily operations during the peak month are derived by taking the number of operations calculated for the peak month and dividing by 30 days. The peak hour operations at F45 are estimated to be 10 percent of the peak month, average day. **Table ES-7** illustrates various calculated peak activity levels for the planning period.

TABLE ES-7
Forecast of Peak Activity Levels, 2005-2025

	Base Year	Forecast				
	2004	2005	2010	2015	2020	2025
Annual	69,875	70,850	78,419	88,007	98,768	110,844
Peak Month	6,987	7,085	7,841	8,800	9,876	11,084
Peak Month Average Day	233	236	261	293	329	369
Peak Hour	23	24	26	29	33	37

Source: Ricondo & Associates

Based Aircraft

The number of based aircraft provides a basic indicator of general aviation demand at an airport. By first developing a forecast of based aircraft, the growth of other factors can be projected. The 2004 Base Year number of 215 based aircraft is from official FAA records and was verified by the Fixed Base Operator (FBO) at F45.

In projecting based aircraft at F45, local and national growth trends were considered, along with the role that competing airports and ongoing development may play in the decision of aircraft owners to base at a particular airport. In doing so, a data "disjunct" appears. While FAA projected the U.S. active general aviation aircraft fleet to grow at an average annual rate of 0.81 percent from 2004 to 2016, the agency projected practically no growth (0.08 percent) in based aircraft at F45 during the same period. Based on the 2004 Terminal Area Forecast (TAF), the airport would experience only three additional based aircraft by 2016.

This was not the case for other airports in Palm Beach County, however. The TAF projected that **LNA would see an additional 111 based aircraft** and **PBI would see an addition of 27 based aircraft** in spite of the somewhat higher costs associated with PBI operations.

After reviewing facilities at both LNA and PBI, it was determined that a combination of factors, including traffic restrictions at LNA and cost considerations, would make it highly

improbable that LNA and PBI could support the number of based aircraft forecast in the TAF.

The assumptions guiding the development of based aircraft forecasts for F45 are as follows:

1. Approximately half of the projected growth in based aircraft at LNA would shift to F45
2. That these aircraft would consist of single- and twin-engine piston and a limited number of turbo-prop aircraft; and
3. There would be a "transition" of based aircraft at PBI, with more and more piston aircraft, turbo-props and light jets choosing F45 as a base while the larger, heavier corporate jets developed basing arrangements at PBI.

Table ES-8 shows the forecast of based aircraft for F45. From a confirmed base of 215 aircraft in 2004, based aircraft are projected to increase steadily through the planning period to 329 based aircraft in 2025.

TABLE ES-8
Forecast of Based Aircraft by Fleet Mix, 2005-2025

Year	Single-Engine	Multi-Engine	Turbo-Prop	Jet	Rotor	Other	Total
Base Year							
2004	128	47	20	7	5	8	215
Forecast							
2005	130	47	20	8	5	8	218
2010	146	48	21	11	6	7	239
2015	166	50	22	14	8	6	266
2020	188	51	23	19	10	5	296
2025	213	52	24	24	11	5	329

Source: Ricondo & Associates

Aircraft Using and Projected to Use F45

At present, the airport is assigned an **ARC of B-II**, which represents aircraft with approach speeds up to 121 knots and wingspans up to 79 feet. This classification covers most small single and twin-engine piston aircraft, a significant percentage of the turboprop fleet and a small number of business jets.

The CH2M HILL Master Plan Team confirmed the adequacy of the existing ARC of B-II for *most* airport operations throughout the planning period, but noted the increased likelihood that **more and larger jet aircraft would be based at F45 and use it more frequently** in lieu of Palm Beach International Airport (itinerant traffic). A representative sample of the business jets expected to use F45 in the future is presented in **Table ES-9.**

TABLE ES-9
Representative Business Jets Expected at F45

Aircraft Model	Est. Percent Jet Operations at PBI[1]	Approach Category	Maximum Takeoff Weight (lbs)	Wingspan and Design Group
Bombardier Learjet 35A	4.8	D	18,300	39'-6" – I
Bombardier Learjet 45	1.6	C	19,500	47'-1" – I
Bombardier Learjet 60	4.6	C	23,500	43'-9" – I
Cessna Citation II	3.0	B	15,900	52'-2" – II
Cessna Citation V	7.6	B	15,900	52'-2" – II
Cessna Citation VI/VII	3.6	C	22,450	53'-6" – II
Dassault Falcon 10	5.3	B	18,740	42'-11" – I
Dassault Falcon 20	5.3	B	28,660	53'-6" – II
Raytheon Beechjet 400	3.8	B	16,100	43'-6" – I
Raytheon Hawker 700	4.9	C	25,500	47'-0" – I
Raytheon Hawker 800XP	4.9	C	28,000	51'-5" – II

Note: 1. PBI is the three-letter airport code for the Palm Beach International Airport.

Source: PBI Operations Report—3/14/05-3/20/05; FAA AC 150/5300-13 *Airport Design*, Change 10; *Burns & McDonnell's Aircraft Characteristics* (8th Edition)

As noted in the table above, several of the business jets fall in approach category C and one into category D. Given that the design requirements for approach categories C and D are essentially the same, and given the projected numbers of business jet aircraft of the type and size in Table ES-9, **the CH2M HILL Team recommended that one of the runways at F45 be upgraded to C-II design standards** to accommodate future demand.

Airfield Capacity

Once the CH2M HILL Team had a forecast of future activity and an understanding of the fleet mix that would use F45 over the planning period, it considered whether the present airfield configuration is capable of handling this volume and mix of aircraft. Using two independent methodologies – Hourly Runway Capacity and Annual Service Volume – the Team **concluded that the present runway system would be capable of supporting the projected activity demand throughout the planning period and that no capacity enhancement projects are needed**. These analyses reveal that in the base year, 2004, the airport operated at roughly 18 percent of its capacity, and that by 2025 the airfield will operate at only 40 percent of its theoretical capacity.

Runway Length and Strength

Given that projected future activity at F45 indicates increasing numbers of larger jet aircraft, the CH2M HILL Team examined runway length and strength. The longest and widest runway at F45 is Runway 8R/26L at 4,300 feet (length) and 100 feet wide. It is constructed

of asphalt pavement with a strength rating of 12,500 pounds, and is considered the primary runway at F45. The only other paved (asphalt) runway, Runway 13/31, is designated the crosswind runway, is oriented in an northwest–southeast direction, and is 4,300 feet long and 75 feet wide with a strength rating of 30,000 pounds (single-wheel loading).

The length of a runway or a system of runways is a critical component that defines the capability of an airport to accommodate specific types of air traffic and to allow aircraft to fly longer stage lengths (distances) with higher payloads.

In the past, Palm Beach County Park Airport (LNA) has accommodated a significant share of the small GA activity that might otherwise occur at PBI. However, LNA is not able to accommodate jets due to a ban on those aircraft and short runway length. As a result, the County has decided that F45 should assume an increasing role in the county airport system as the only facility able to accommodate additional GA activity by small- to mid-size jets seeking to base and operate away from PBI.

Accordingly, the CH2M HILL Team examined runway length. The Palm Beach County Department of Airports listed its desired performance parameters for sufficient runway length at F45:

- A length adequate to meet the needs of the **entire fleet of light jets operating under dry conditions**;
- A length adequate to address the needs of a **significant share of the fleet of mid-size jets under dry conditions**.

After further analyses, it was determined that an extension of one of the two paved runways to a total length of 6,000 feet would satisfy DOA's desires. At a runway length of 6,000 feet, popular aircraft in the county's airspace – the Citation III; Learjet 35 and 45; Citation VI, VII and X; and Hawker 125-800 – would be able to utilize F45. Meeting the needs of the light and mid-size jets, along with the piston and turbo-prop market, is consistent with the designated role that F45 plays in the county's four-airport system.

Additional analyses led to a proposal to **lengthen Runway 13/31 to a total length of 6,000 feet** from its current length of 4,300 feet.

Summary of F45 Facility Requirements

Given projected activity levels and types of aircraft, the CH2M HILL Team computed facility area requirements for various purposes, i.e., aircraft parking, auto parking and so on. The facility needs over the planning period are tabulated in **Table ES-10** below.

TABLE ES-10
Facility Requirements for General Aviation Activity at F45, 2025

Facilities	Existing Facilities	2025 Requirement	Shortfall
Terminal Building/FBO	6,808	11,084	(4,276)
Aircraft Apron	824,400	1,524,837	(700,437)
Hangars			
T-Hangars	231,780	315,240	(83,460)
Corporate	73,330	117,504	(44,174)
Conventional	55,800	113,339	(57,539)
Total Hangar Facilities	360,910	546,074	(185,164)
Auto Parking[1]	43,250	69,879	(26,629)

Note: 1. Auto parking associated with hangars only.

Before implementation of any recommended improvements at F45 occur, any development is subject to review by the County's Planning, Zoning and Building Administrator for a determination by the Board whether the change constitutes a substantial deviation as provided in Section 380.06 (19), Florida Statutes.

Any planned facilities can only be built if demand actually materializes, and are subject to the availability of funding, FAA approval, and any environmental and local approvals.

Proposed Improvements

After extensive data-gathering, analyses, and coordination with the Department of Airports, the following projects, as shown in **Exhibit ES-5**, are proposed for implementation at F45 over the planning period:

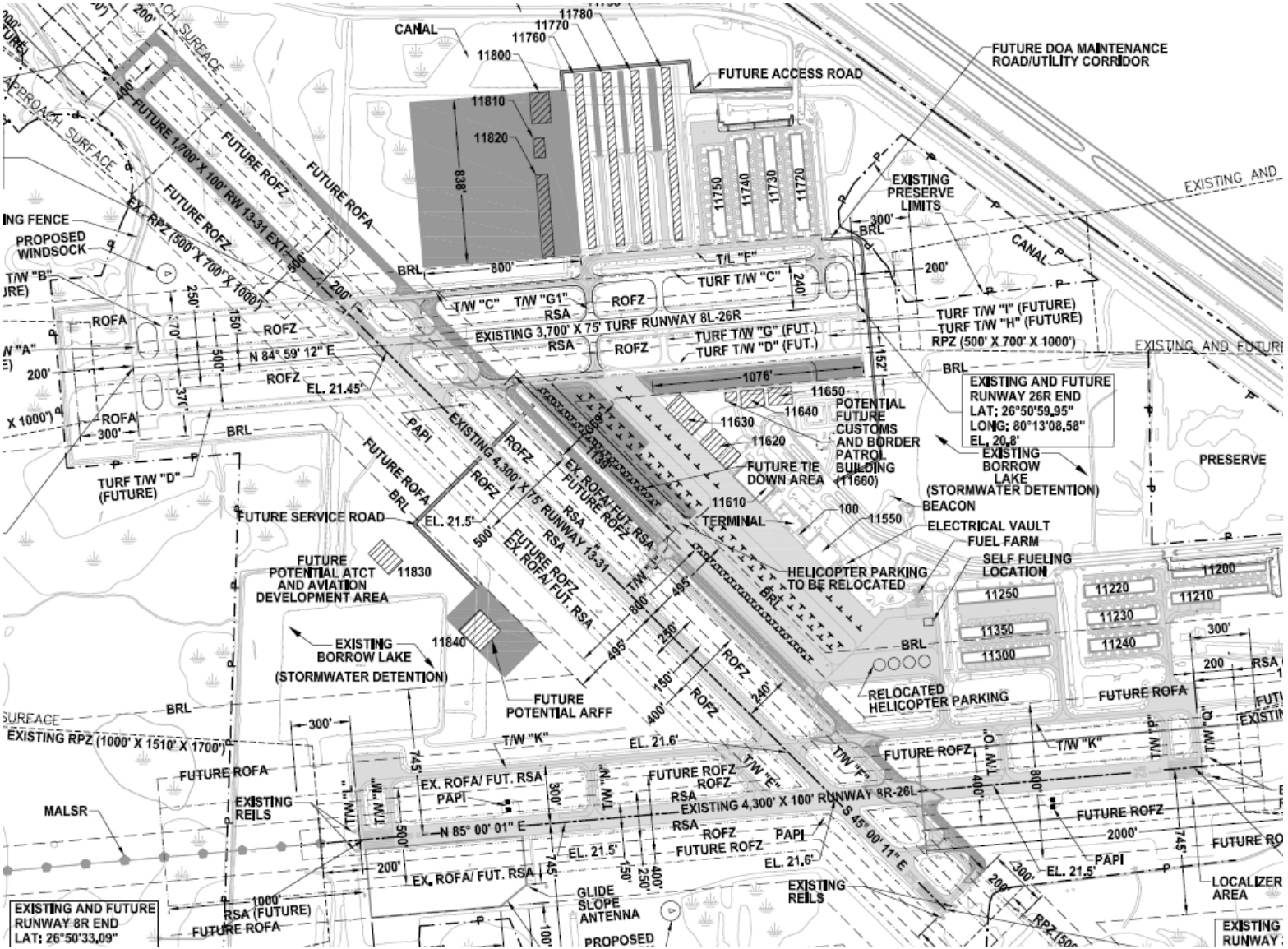
- Extension of Runway 13/31 by 1,700 feet to create a 6,000-foot runway, and widening to 100 feet to meet ADG C II requirements
- Realignment of the airport entrance roadway to accommodate the Runway 13/31 extension
- Increased separation distance from 240 feet at present to 300 feet between Runway 13/31 and Taxiway F to accommodate the projected change in aircraft use (to C-II aircraft)
- Strengthening of Runway 8R/26L pavement to accommodate future projected aircraft
- Implementation of a Category I ILS for Runway 8R/26L (CAT I exists on 8R except for existing nonprecision markings) or equivalent approach, such as an LPV approach.
- Construction of four rows of T-hangars and one row of corporate hangars north of Taxiway C, and an access road and aircraft parking apron to serve these facilities
- Expansion of the existing apron northwest of the terminal building and construction of two corporate hangars to serve this apron
- Construction of up to two new access roads from Beeline Highway

Following the conclusion of the October 2006 MPU, meetings were held between the DOA and the Aviation and Airports Advisory Board (AAAB) to discuss the results of the master plan. Recommendations resulting from decisions made during those meetings required additions to the MPU. While these specific additions were incorporated into the Executive Summary, not all revisions were carried through the entire MPU and ALP update; therefore, the final date of the documents contained in the October 2006 MPU remains unchanged. Select pages in this MPU were revised to incorporate the recommendations of the AAAB and are summarized below:

- Executive Summary; Exhibit ES-5, F45 Preferred Plan - Exhibit has been replaced based on changes made to the ALP sheet replaced in it's entirety incorporating additions summarized in Addendum #1 dated March 10, 2008.
- October 2006 Technical Report No. 7; Table of Contents – The Table of Contents was updated as a result of added text throughout the document.
- October 2006 Technical Report No. 7; Section 1.4 Runway Approach Aids and Lighting Page 1-2 – Recommendation to pursue the initiation and programming of an ILS.
- October 2006 Technical Report No. 7; Section 1.8 Airside Development Page 1-3 – Recommendation to show an apron expansion area on the ALP as fixed wing or helicopter, depending on the demand.
- October 2006 Technical Report No. 7; Section 1.9 Automobile Access and Parking Page 1-3 – The DOA is working on a project to expand automobile parking capacity to accommodate recent facility plans.
- October 2006 Technical Report No. 7; Attachment 1, Airport Layout Plan Page 2 of 9 - The ALP sheet was replaced in it's entirety incorporating additions addressed in Addendum #1 dated March 10, 2008.

Finally, the select pages affected by these changes are marked in the MPU with a date in the footer.

EXHIBIT ES-5
F45 Preferred Plan



Note: Exhibit has been revised to incorporate changes addressed in Addendum #1, dated March 10, 2008.

Prepared by: CH2M HILL, March 10, 2008.

Technical Report #1

North Palm Beach County General Aviation Airport Inventory

North Palm Beach County General Aviation Airport

Prepared for

Palm Beach County Department of Airports

APRIL 2006

CH2MHILL
In Association with Ricondo & Associates, Inc.

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Exhibits

SECTION 1

Airfield Facilities

1.1 Runways

North Palm Beach County General Aviation Airport (F45) has three runways, two of which are asphalt-surfaced and capable of handling small aircraft weighing between 12,500 and 30,000 pounds. These runways are designated Runway 8R/26L and Runway 13/31. The third runway, designated 8L/26R, is turf and located 2,500 feet north of its parallel runway, and used for VFR traffic only. Pavement conditions described below were obtained from the Draft January 2006 Annual Airports Pavement Evaluation prepared by Applied Pavement Technology, Inc. The current airfield layout is illustrated in **Exhibit 1-1**.

1.1.1 Runway 8R/26L

Runway 8R/26L, the primary runway used at F45, is 4,300 feet long and 100 feet wide with an asphalt surface. Pavement strength is published at 12,500 pound and aircraft over 12,500 pounds are prohibited. This runway exhibits only a minor amount of low-severity cracking located at the paving lane joints along the length of the runway.

1.1.2 Runway 13/31

Runway 13/31 is a crosswind runway that is 4,300 feet long and 75 feet wide. Pavement strength is published at 30,000 pounds. Runway 13/31 is in similar condition to that of Runway 8R/26L, exhibiting only a small amount of low-severity cracking typically located at the centerline paving lane joint.

1.1.3 Runway 8L/26R

Runway 8L/26R is a turf runway at a length of 3,700 feet and width of 75 feet.

1.2 Taxiways

1.2.1 Runway 8R/26L Connecting Taxiways

Seven asphalt-surfaced taxiway pavements, including Taxiways L, M, N, E, O, P, and Q, connect Runway 8R/26L to its parallel taxiway, Taxiway K. All seven taxiways were constructed at the same time and are in similar condition, exhibiting little to no distress.

1.2.2 Taxiway K

Taxiway K, an asphalt-surfaced pavement, serves as the parallel taxiway to Runway 8R/26L and, much like the connecting taxiways, is exhibiting only a minor amount of low-severity cracking and surface cracking.

Source: Southern Resources and Mapping of Miami, July 2005
Prepared by: CH2M HILL, Inc., April 2006

Exhibit 1-1

0 500 1000 1500
1"=1,000'

north

Existing Airport

1.2.3 Runway 13/31 Connecting Taxiways

Three asphalt-surfaced taxiways and the small paved portion of Runway 8L/26R provide access to Runway 13/31 from Taxiway F. The connecting taxiways include Taxiway D, J, and R. Overall, these facilities are performing well and exhibit only a minor amount of distress.

1.2.4 Taxiway F

Taxiway F is constructed of an asphalt-surfaced pavement, parallel to Runway 13/31, and provides access to the main terminal apron area. For the most part, Taxiway F is performing well and exhibits only a moderate amount of cracking that is generally confined to the centerline paving joint and some slightly deteriorated joints at the intersections with connecting taxiways.

1.2.5 Apron Access Taxiways

Three asphalt-surfaced taxiways provide access to the main terminal apron area, all of which are performing well.

1.2.6 Taxiway C

Taxiway C is a recently constructed asphalt-surfaced pavement and provides access to the newly constructed hangars on the north side of the airport. Taxiway C exhibits only a very small amount of low-severity cracking.

1.3 Apron Areas

1.3.1 Main Terminal Apron

Four pavement sections comprise the main terminal apron at North County Airport. Two are asphalt-surfaced pavements and two are concrete pavements. The concrete pavement sections are very small in comparison to the asphalt sections and have two distinct functions: one serves as a helipad and the other serves as the fuel farm parking area. Overall, the asphalt-surfaced apron sections are both performing well, although areas of distress are present on both sections.

1.3.2 T-Hangar Aprons

Three sets of asphalt-surfaced t-hangar aprons are located at North County Airport. One set is located to the north of Taxiway C, and the remaining two are located to the south and are accessible from Taxiway K. The t-hangar aprons adjacent to Taxiway C were recently constructed and exhibit only a small amount of low-severity cracking. Of the two sets of t-hangars located on the south side of the airport, the set to the west is showing more signs of deterioration with the presence of some large areas of depressions. Other distresses observed include very minor amounts of low-severity patching, cracking, and weathering.

1.4 Fences and Security Gates

The Airport is equipped with a six-foot high perimeter chain link fence topped with three-string barbed wire. As shown in **Exhibit 1-2**, this security fence runs along both the eastern and western boundaries of the Airport property. On the east side of the Airport property, the perimeter fence follows the berm that separates the Sweetbay Natural Area from the airfield. On the west side of the Airport, the perimeter fencing runs along the Airport access road. Additional fencing also separates the Sweetbay Natural Area east of Runway 26R from the airfield. The recent addition of t-hangars north of Runway 8L/26R has also led to the installation of a 2,000-foot long perimeter fence that runs north and west of these hangars.

The airfield remains accessible to authorized vehicles though seven access gates along the perimeter fencing. **Exhibit 1-2** also shows the location of these security gates.

1.5 Lighting, Marking, Navigational Aids, and Signage

1.5.1 Lighting

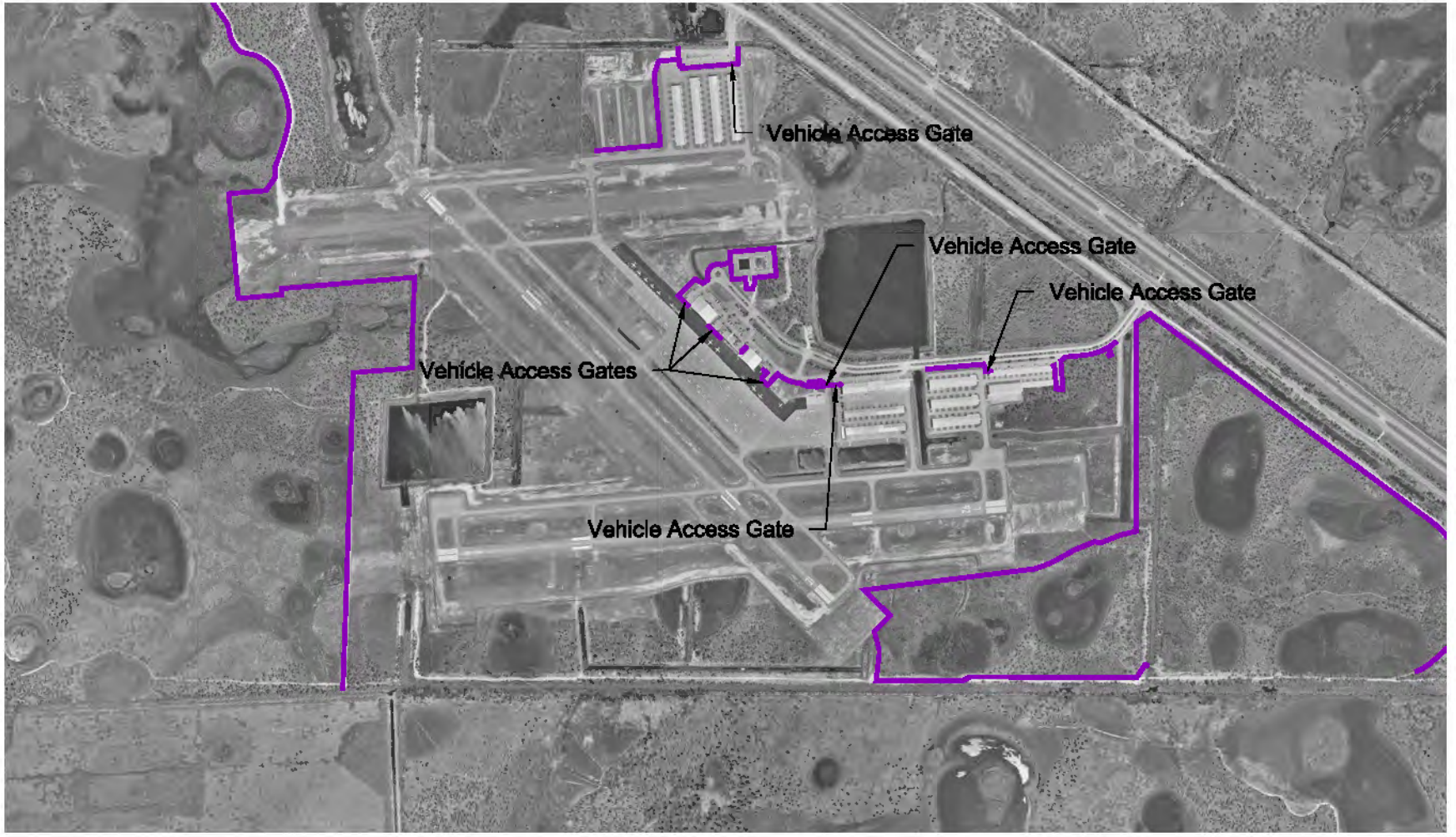
The lighting system at F45 includes airport identification lighting, runway and taxiway edge lighting, approach lighting, and flood lighting for certain apron areas. Because there is no Airport Traffic Control Tower at F45, a pilot-controlled lighting system is provided. The lighting system at F45 is available to pilots between dusk and dawn.

At night, or during adverse weather conditions, the location of the Airport is indicated by the rotating beacon that is sited between the Airport entrance road (Aviation Boulevard) and the borrow lake east of Runway 13/31 alignment, approximately 430 feet east of the FBO terminal building. This beacon, which has an optical rotating beacon system that projects two beams of light, one green and one white, 180 degrees apart, is in good condition.

Both Runways 13/31 and 8R/26L have pavement edge lighting for nighttime operations. Runway 8R/26L is equipped with high intensity runway lights (HIRL), while Runway 13/31 is equipped with medium intensity runway lights (MIRL). The pilot-controlled lighting system is operated through the Common Traffic Advisory Frequency (CTAF), which is the same as the Unicom frequency of 123.075 MHz. Runway 8L/26R, the grass runway, is not equipped with a pavement edge lighting system.

As part of the runway lighting system, identification of the runway end, or threshold, is of major importance to a pilot during landing and takeoff. At F45, Runways 13, 31, 8R, and 26L have runway end identifier lights (REIL). These lights provide pilots with a rapid and positive visual identification of the approach end of the runway during nighttime, instrument, and marginal weather conditions. The REIL system consists of a pair of synchronized white flashing lights facing the approaching aircraft, situated on each side and abeam of the runway end/threshold lights. As of the date of this report, the Runway 13/31 REIL system was reported to be out of service.

As part of the Airport approach lighting system, both ends of Runways 8R/26L and 13/31 have a four light precision approach path indicator (PAPI) system located on the left side of



Source: Aerial Photo, 2001; Ricondo & Associates, Inc., April 2006
Prepared by: Ricondo & Associates, Inc., April 2006

Exhibit 1-2

0 1,200 ft.

north

Fence and Access Gate Locations

Drawing: P:\PBIA\System Wide Airport Master Planning Study - Phase II\Task 2 - Inventory and Data Collection\Exhibits\NCO_Inventory Exhibits.dwg, Layout: 1-3 Fence, Apr 26, 2006, 4:31pm

the runways. This system provides pilots with visual descent guidance information during the approach to a runway. These lights are typically visible from five miles during the day and up to 20 miles or more at night.

All paved taxiways at F45 are equipped with medium intensity taxiway lights (MITL). As with the runway lighting, the taxiway lights are pilot-controlled through the CTAF. In addition to the taxiway edge lighting, light poles equipped with floodlights illuminate most of the main apron area, as well as the fuel farm.

1.5.2 Marking

Pavement markings on Runways 8R/26L and 13/31 satisfy the FAA requirements for non-precision runways. The marking on these runways include designation markers, a centerline strip, aiming point markers, and touchdown zone markings.

With the exception of the turf taxiway, all of the taxiways at F45 have taxiway centerline stripes. Hold short lines are also indicated at all of the required locations on the taxiways. The tie-down areas are also delimited by white stripes.

1.5.3 Navigational Aids

The only navigational aid located on the airfield is the instrument landing system (ILS) that provides precision approach capability to Runway 8R. The PBI very high frequency omni-directional range (VOR) equipment located approximately 12 nautical miles southeast of the Airport is also used to obtain accurate course alignments and conduct instrument approaches at F45. In addition, the global positioning system (GPS) is also available to pilots flying into and out of F45.

According to data obtained from the U.S. Terminal Procedures, effective from April 2006 through May 2006 and published by the U. S. Department of Commerce, a total of four instrument approach procedures are available at the Airport. These procedures include both non-precision and precision approaches and are detailed in the sections that follow.

1.5.3.1 Non-Precision Approaches

Non-precision instrument approaches to F45 are guided by the PBI VOR. This ground-based electronic navigation aid transmits signals or radials to provide signal course guidance to aircraft equipped with VOR receivers, allowing pilots to conduct non-precision approaches when visual meteorological conditions are not attained.

The VOR approach to Runway 8R at F45 has published minimums as follows: minimum descent altitude (MDA) of 677 feet above the touchdown zone elevation (TDZE) (700 feet MSL), 1.0 statute mile visibility for Approach Category A aircraft, 1.25 statute miles visibility for Approach Category B aircraft, 2.0 statute miles visibility for Approach Category C aircraft, and 2.25 statute miles visibility for Approach Category D aircraft.

The other non-precision instrument approaches available at F45 use the GPS. The Runway 8R GPS approach requires 1.0 statute mile visibility for Approach Category A, B, and C aircraft, 1.25 miles visibility for Approach Category D aircraft, and an MDA of 397 feet above the TDZE (420 feet MSL). Different minimums apply to aircraft performing a circle-to-land maneuver.

The GPS circle-to-land approach to Runway 8R has a published MDA of 437 feet above the TDZE (460 feet MSL), 1.0 statute mile visibility for Approach Category A and B aircraft, 1.5 statute miles visibility for Approach Category C aircraft, and 2.0 statute miles visibility for Approach Category D aircraft.

A GPS nonprecision approach is also available to Runway 26L. This approach has an MDA of 397 feet above the TDZE (460 feet MSL) and 1.0 statute mile visibility is required for Approach Category A and B aircraft, 1.25 statute miles visibility is required for Approach Category C aircraft, and 1.5 statute miles visibility is required for Approach Category D aircraft.

For the GPS circle-to-land approach for Runway 26L, the MDA is 457 feet above the TDZE (480 feet MSL). Visibility requirements for this approach are as follows: 1.0 statute mile for Approach Category A and B aircraft, 1.5 statute miles for Approach Category C aircraft, and 2.0 statute miles for Approach Category D aircraft.

1.5.3.2 Precision Approaches

Currently, ILS equipment is installed only for precision approaches to Runway 8R. The purpose of an ILS is to provide precision instrument navigation to a point just beyond the approach end of the runway. As the ILS provides both course (horizontal) and glide slope (vertical) information, much lower weather minimums are possible than those allowed by a non-precision instrument approach. Precision instrument approaches are runway specific and therefore, each runway must have its own ILS.

The ILS to Runway 8R provides landing minimums that offer a decision height of 228 feet above the runway TDZE (251 feet MSL) and ¾ statute mile visibility. Higher minimums are applied if aircraft only use the localizer portion of the ILS equipment or if a circling approach is conducted. These variations of the ILS approach are considered non-precision approaches because they do not use the vertical guidance provided by the glide slope antennae. The localizer approach to Runway 8R has a published MDA of 397 feet above the TDZE (420 feet above feet MSL). The visibility minimums are: 1.0 statute mile for Approach Category A, B, and C aircraft, and 1.25 statute miles for Approach Category D aircraft.

The ILS circle-to-land approach to Runway 8R has a published MDA of 437 feet above the TDZE (460 feet MSL). The visibility minimums are: 1.0 statute mile for Approach Category A and B aircraft, 1.5 statute miles for Approach Category C aircraft, and 2.0 miles for Approach Category D aircraft.

1.5.4 Signage

Airfield signs at F45 were inventoried by conducting an on-site review of the airfield and by reviewing the Airport planimetric base map. Overall, 166 signs were identified along the runways, taxiways, and apron areas. The majority of the airfield signs at the Airport are located along Runways 8L/26R and 13/31, with the greatest concentration in the vicinity of the runway intersections. Although the existing signage is in compliance with FAA AC 150/5340-18D, *Standards for Airport Sign Systems*, several sign panels are faded.

Of the 166 signs identified, 68 are directional signs identifying the designation(s) of the intersecting taxiway(s) leading out of the intersection that a pilot would normally be

expected to turn onto or where the aircraft would hold short. The Airport is also equipped with 50 taxiway position signs used to identify a taxiway on which the aircraft is operating. Finally, a total of 48 holding position signs for taxiway/runway intersections were identified. These signs are located at the hold position markings that intersect the three airport runways. At F45, the majority of the holding position signs are located on the left side of the taxiways intersecting runways. One exception is at the intersection of Taxiways K and R with Runway 13/31, where holding position signs are installed on both sides of the taxiways.

SECTION 2

Aviation Tenant Facilities

2.1 General Aviation Facilities

General Aviation (GA) facilities currently consist of the paved apron located east of Runway 13/31 alignment, shade ports, t-hangars, conventional hangars, corporate hangars, and the FBO terminal building. These facilities are accessed directly via Aviation Boulevard, a two lane road that intersects the Bee Line Highway, in the northwest quadrant of the airfield. Because the Airport opened only 12 years ago, the general aviation facilities at F45 are in good to excellent condition.

2.1.1 FBO Terminal Building

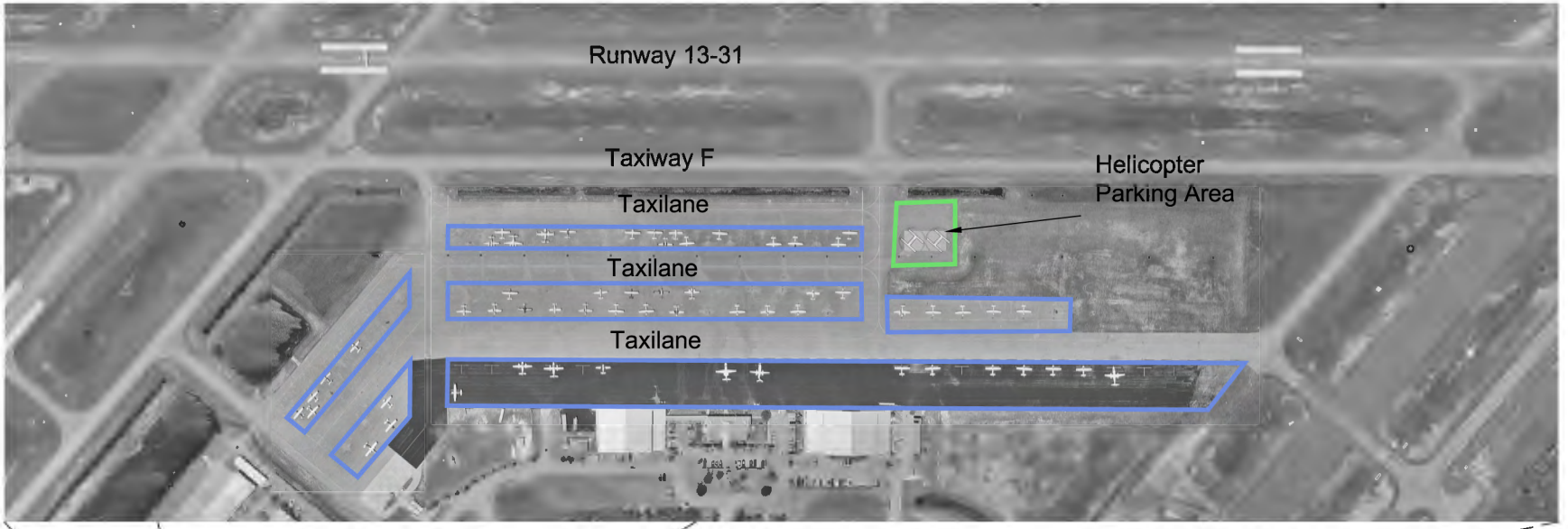
The FBO Terminal Building is in excellent condition and is centrally located on the airfield, east of Runway 13/31, and between the alignments of the two parallel runways. With approximately 6,808 square feet, the terminal building houses three tenants and several administrative offices. The first level is occupied by Landmark Aviation (the main fixed base operator at F45) and the Department of Airports and consists of 3,958 square feet of space. The second level is occupied by Barry Aviation Florida and Sunquest Aviation and consists of 2,850 square feet of space. The services offered by these aviation tenants are detailed in Section 3.2.2 of this document.

2.1.2 Aircraft Parking and Apron Areas

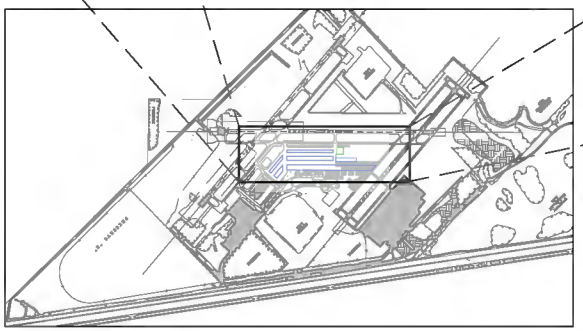
As shown in **Exhibit 2-1**, the aircraft parking apron is centralized at one location on the Airport. This apron is situated east of Runway 13/31, between the Runways 8/26 centerlines, and adjacent to the FBO terminal building and clearspan hangars. This apron provides approximately 82 tiedowns spaces over an aircraft parking area of approximately 40,550 square yards (excluding aircraft movement areas). Since the area located adjacent to and southwest of the FBO terminal facility provides easy access to the FBO terminal building, it is used primarily for the parking of transient aircraft. The transient aircraft fleet mix operating on the apron is diverse, ranging from single engine aircraft to small business jets. The rest of the ramp is dedicated to the parking of aircraft that permanently reside at F45 and include all aircraft tie-down facilities. The based aircraft ramp offers 34 tie-down spaces sized for small single engine aircraft and 48 tie-down spaces sized for multi-engine aircraft. The itinerant and based aircraft aprons are in good condition. These two aprons, including aircraft parking areas and aircraft movement areas (taxilanes) encompass 91,600 square yards of ramp space.

2.1.3 Aircraft Storage

Available hangar space exists in the form of t-hangar, shade ports, corporate/clearspan hangar, and conventional hangar. The hangars are owned by the Palm Beach County DOA



Key Map



Legend:
- Aircraft Parking Area
- Helicopter Parking Area

Source: Aerial Photo, 2001; Ricondo & Associates, Inc., April 2006
Prepared by: Ricondo & Associates, Inc., April 2006

Exhibit 2-1

0 400 ft.

north

Aircraft Parking Areas

Drawing: P:\PBIA\System Wide Airport Master Planning Study - Phase II\Task 2 - Inventory and Data Collection\Exhibits\NCO_Inventory Exhibits.dwg, Layout: 2-1 Aircraft Parking, Apr 26, 2006, 4:08pm

and leased to various tenants. The majority of the hangars are in good to excellent condition. Only a few hangars suffered major damage from the previous hurricane season and are in the process of being repaired. **Exhibit 2-2** shows the location of these hangars at F45.

For the purpose of this report, corporate/clearspan hangars are defined as enclosed building capable of holding between four and six aircraft each. These hangars are larger than the conventional hangars with attached offices.

A total of 150 t-hangars are provided at the Airport. The newest t-hangars were built in the northern section of the airfield, north of Runway 8L/26R. In that area, there are four rows of t-hangars, providing a total of 78 units. The first three hangars to the east are approximately 29,765 square feet in size and provide 20 individual units each, while the last t-hangar is approximately 26,935 square feet in size and provides 18 hangar units. All of these t-hangar units are occupied. These hangars are reported to be in very good condition.

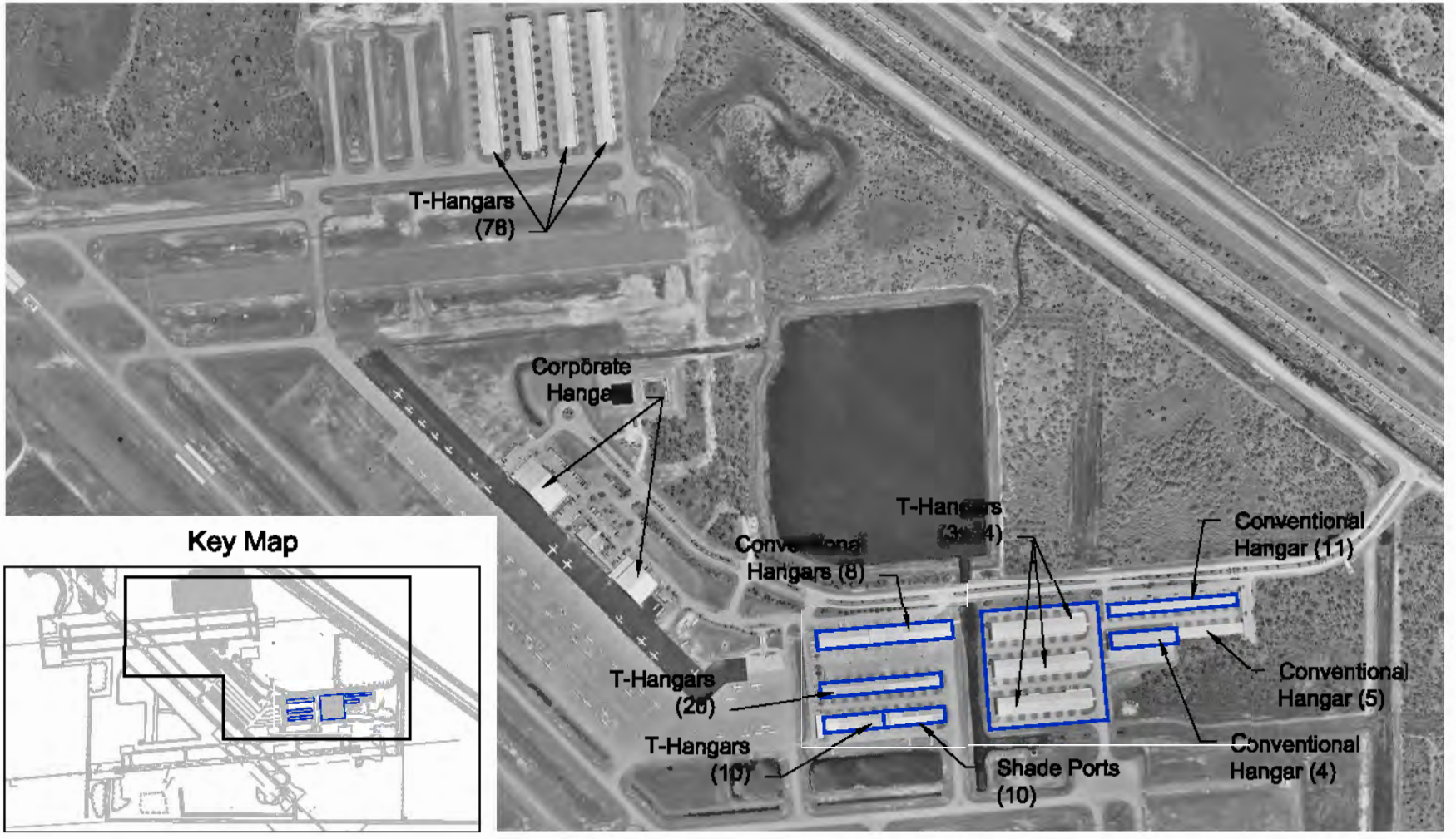
As shown in Exhibit 2-2, the last 72 t-hangars units are located in an area northwest of the Runway 26L end and south of the Airport entrance road. This area provides five rows of t-hangars. The two t-hangars east of the aircraft parking apron are approximately 23,950 and 11,860 square feet each. These provide a total of 30 units. The three rows of t-hangars further to the east provide a total of 42 units. Each t-hangar is 22,600 square feet in size and provides 14 hangar units.

The 10 shade ports are located adjacent to and east of the 11,860 square-foot t-hangar. These hangars provide approximately 11,940 square feet of aircraft storage space. The corporate/clearspan hangars are northwest and southeast of the FBO terminal building. The clear span hangar located approximately 100 feet southeast of the FBO terminal building is approximately 14,800 square feet in size. This hangar is leased by Aircraft Maintenance Specialists (AMS) for the storage, maintenance, and repair of aircraft. Approximately 3,475 square feet of the total hangar space is dedicated to office space.

The corporate hangar north of the FBO terminal building comprises a total area of 19,000 square feet used for aircraft storage. As of March 2006, there were six aircraft stored in this hangar, including two Cessna Citations, two King Air 350s, one Beech Barron, and one King Air 200. Both corporate/clearspan hangars are reported in good condition.

The first row of conventional hangars is located east of the aircraft parking apron and includes eight units. These hangars are used for aircraft maintenance, as well as storage. Each unit provides 3,970 square feet of hangar space, for a total of 31,760 square feet.

The last two rows of conventional hangars are located north of the Runway 26 end, in the eastern portion of the main hangar area. These two rows of hangars include 20 units that vary in size. Overall, these units provide approximately 41,570 square feet of hangar storage space. The conventional hangars at F45 are in good condition. The breakdown of each facility is summarized in **Table 2-1**.



Source: Aerial Photo, 2001; Ricondo & Associates, Inc., April 2006
Prepared by: Ricondo & Associates, Inc., April 2006

Exhibit 2-2

0 600 ft.

north

Aircraft Storage

Drawing: P:\PBIA\System Wide Airport Master Planning Study - Phase II\Task 2 - Inventory and Data Collection\Exhibits\NCO_Inventory Exhibits.dwg, Layout: 2-2 Aircraft Storage, Apr 26, 2006, 4:11pm

TABLE 2-1
Hangar Facilities

Hangar Type	Number of Units	Total Square Footage
T-hangar	150	219,840
Shade Port	10	11,940
Conventional Hangar	28	73,330
Corporate/Clearspan Hangar	2	33,800
	Total:	**338,910**

Source: Airport Layout Drawing, November 2003; Field Check, March 2006.
Prepared by: Ricondo & Associates, Inc. April 2006.

2.1.4 Helicopter Facilities

As of March 2006, there was no helipad at F45. Helicopters conduct landing and takeoff operations on the runways, taxiways, or ramp. Helicopter facilities at F45 include one parking area dedicated to the parking of rotorcraft. This area includes one concrete pad that encompasses an area of approximately 18,400 square feet. This pad was originally intended to be used as a helipad. However, the Palm Beach County DOA had to reclassify this pad as a helicopter parking area only due to lack of clearance between the two helipads.

As shown on Exhibit 2-1, the helicopter parking area is situated between the alignment of Taxiway F and the main apron, in the southwest corner of the fixed-wing aircraft parking area.

2.2 Fixed Base Operator and Other Aviation Tenants

The subsections that follow provide a brief overview of the types of services offered by Landmark Aviation, the sole Fixed Base Operator at F45, and the main aviation tenants located on the field.

2.2.1 Fixed Base Operator

Landmark Aviation is the sole FBO at F45, providing a variety of services to general aviation users. As of March 2006, Landmark Aviation's activity was primarily geared to the piston aircraft market, although the needs of turboprop and business jet aircraft are also served.

Landmark's activities are concentrated on the ramp where it maintains all 82 existing tiedowns, and in the large corporate hangar north of the FBO terminal building, where it subleases aircraft storage space.

Landmark Aviation occupies almost the entire lower level of the terminal building. The FBO has eleven employees, nine of which are full time. Landmark Aviation also maintains a small fleet of equipment that includes aircraft stairs, ground power units, baggage loader, tug/pushback tractors, and air start units.

2.2.2 Other Aviation Tenants

Other general aviation tenants located at the Airport include Aircraft Maintenance Specialists, Aeronautx USA Corp., Barry Aviation Florida, Cloud 9 Helicopters, Ocean Helicopters, and Sunquest Aviation. The locations of these tenants are highlighted on **Exhibit 2-3**.

2.2.2.1 Aircraft Maintenance Specialists, Inc.

Aircraft Maintenance Specialists lease approximately 1,975 square feet of office space and 11,325 square feet of hangar space used for aircraft maintenance and repair activity, as well as aircraft storage. Aircraft Maintenance Specialists main hangar and offices are located approximately 100 feet southeast of the FBO terminal building. The office building, as well as the hangar, is in good condition. Aircraft Maintenance Specialists' main line of business is aircraft maintenance and aircraft sales/leasing/brokerage.

2.2.2.2 Aeronautx USA Corp.

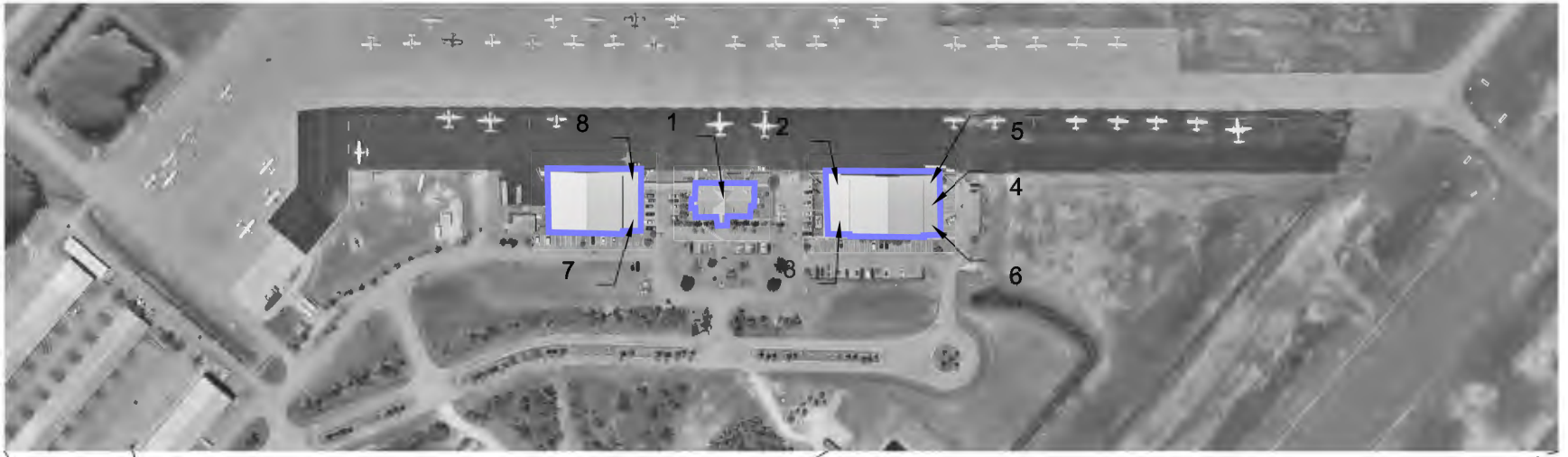
Aeronautx USA Corp., located on the south side of the clearspan hangar, northwest of the FBO terminal building, leases 1,500 square feet of office space and 10 tie-down spaces. Aeronautx USA's office facilities are in good condition. The company has a fleet of nine based aircraft, including seven Cessna 172 aircraft, one Cessna 182, and one Piper Seminole. Aeronautx provides aircraft rental, flight instruction (Airline Training Programs [ATP], Certified Flight Instructor [CFI and CFII], Multi-engine Instructor [MEI], commercial, private, instrument, seaplane, tail-wheel), aircraft sale, and aircraft charter services.

2.2.2.3 Barry Aviation Florida, Inc.

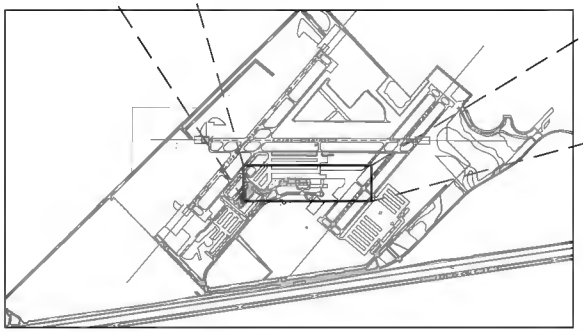
Barry Aviation Florida leases 750 square feet of office space on the second floor of the terminal building. In addition, Barry Aviation leases two of the conventional hangars west of the existing fuel farm. In these hangars, Barry Aviation manufactures and performs maintenance on glider aircraft.

2.2.2.4 Cloud 9 Helicopters

The offices for Cloud 9 Helicopters are located on the north side of the corporate hangar, northwest of the FBO terminal building. Cloud 9 Helicopters, an FAR Part 141 helicopter flight training school, employs three flight instructors and one administrative employee. Cloud 9 leases 750 square feet of office space and also operates from two t-hangars on the north side of the airfield. The fleet operated by Cloud 9 Helicopters includes two Robinson R-44 helicopters and one Robinson R-22 helicopter. Cloud 9 is expected to acquire a Hughes 500 helicopter in April 2006, adding one more aircraft to its fleet. Representatives from Cloud 9 Helicopters indicated a desire to acquire additional helicopters in the future. Cloud 9 also plans to apply for FAR Part 135 certification to expand its line of business and provide charter services. Cloud 9 Helicopters uses the turf runway for landing when possible and taxiways for landing when the turf runway is not available.



Key Map



Building No.:	Tenant:
1	Terminal
1a	Landmark Aviation
1b	Barry Aviation
1c	Sunquest Aviation
1d	DOA Offices
2	Sherman Aircraft Sales
3	Aeronautx USA Corp
4	Cloud 9 Helicopters
5	Vacant
6	Enterprise Rent-A-Car
7	Ocean Helicopters
8	Aircraft Maintenance Spacialists, Inc.

Source: Aerial Photo, 2001; Ricondo & Associates, Inc., April 2006
Prepared by: Ricondo & Associates, Inc., April 2006

Exhibit 2-3

0 300 ft.

north

Main Aviation Tenants

Drawing: P:\PBIA\System Wide Airport Master Planning Study - Phase II\Task 2 - Inventory and Data Collection\Exhibits\NCO_Inventory Exhibits.dwg, Layout: 2-3 Main Aviation Tenants, Apr 26, 2006, 4:16pm

Daily operations currently number three or four flights per day, with plans to expand operations to 12 flights per day. Services provided by Cloud 9 Helicopters include: FAR Part 141 training, flight instruction (private, instrument, commercial, CFI), aerial photography, agricultural operations, aerial surveys, and sightseeing tours.

2.2.2.5 Ocean Helicopters

Located on the northwest side of the Aircraft Maintenance Specialists hangar, Ocean Helicopters is an FAR Part 141 helicopter flight training school, similar to Cloud 9 Helicopters. Ocean Helicopters is currently leasing 1,500 square feet of office space, as well as two t-hangars on the north side of the airfield.

Ocean Helicopters' aircraft fleet consists of eight Robinson R-22 helicopters, two Robinson R-44 helicopters, and a Jet Ranger helicopter. Representatives from Ocean Helicopters indicated plans to add up to nine additional aircraft. Similar to Cloud 9 Helicopters, Ocean Helicopters takes off and lands on the turf runway or adjacent taxiways next to its t-hangar facilities.

Ocean Helicopters employs eight people, including five flight instructors and three administrative employees. The facilities leased by Ocean Helicopters are well maintained and in good condition. Ocean Helicopters offers the following services: rotorcraft rental, flight instruction (ATP, CFI, CFII, commercial, private, rotary wing), aerial photography, agricultural operations, aircraft painting, aircraft parts, and aircraft sales. Ocean Helicopters has also applied for FAR Part 135 certification and plans to begin charter flights in the near future.

2.2.2.6 Sherman Aircraft Sales

Located next to Aeronautx USA Corp, Sherman Aircraft Sales buy, sale and trade aircraft. This tenant currently leases 1,500 square feet of office space.

2.2.2.7 Sunquest Aviation

Sunquest Aviation, which is an Part 141 fixed-wing aircraft flight training school , leases 750 square feet of office space on the second floor of the terminal building, which is in excellent condition. In addition, Sunquest rents one t-hangar used for the storage of materials and supplies. Sunquest Aviation has two owners and ten employees, including eight flight instructors and two administrative employees. Its aircraft fleet includes four Cessna 172s, one Cessna 152, and one Piper Arrow. In addition, Sunquest Aviation also owns a Cirrus simulator and has the only Lasergrade testing facility on the airfield.

2.3 Air Cargo Facilities

Currently, there are no air cargo facilities located at the Airport.

SECTION 3

Airport Support Facilities

3.1 Airport Maintenance Facilities

All preventive and corrective maintenance activities at the Airport are the responsibility of the DOA Maintenance Division, which is headquartered at Palm Beach International Airport. As all F45 facilities are owned by Palm Beach County, the DOA Maintenance Division is responsible for the maintenance of both the airside and landside facilities.

3.2 Airport Rescue and Fire Fighting Facilities

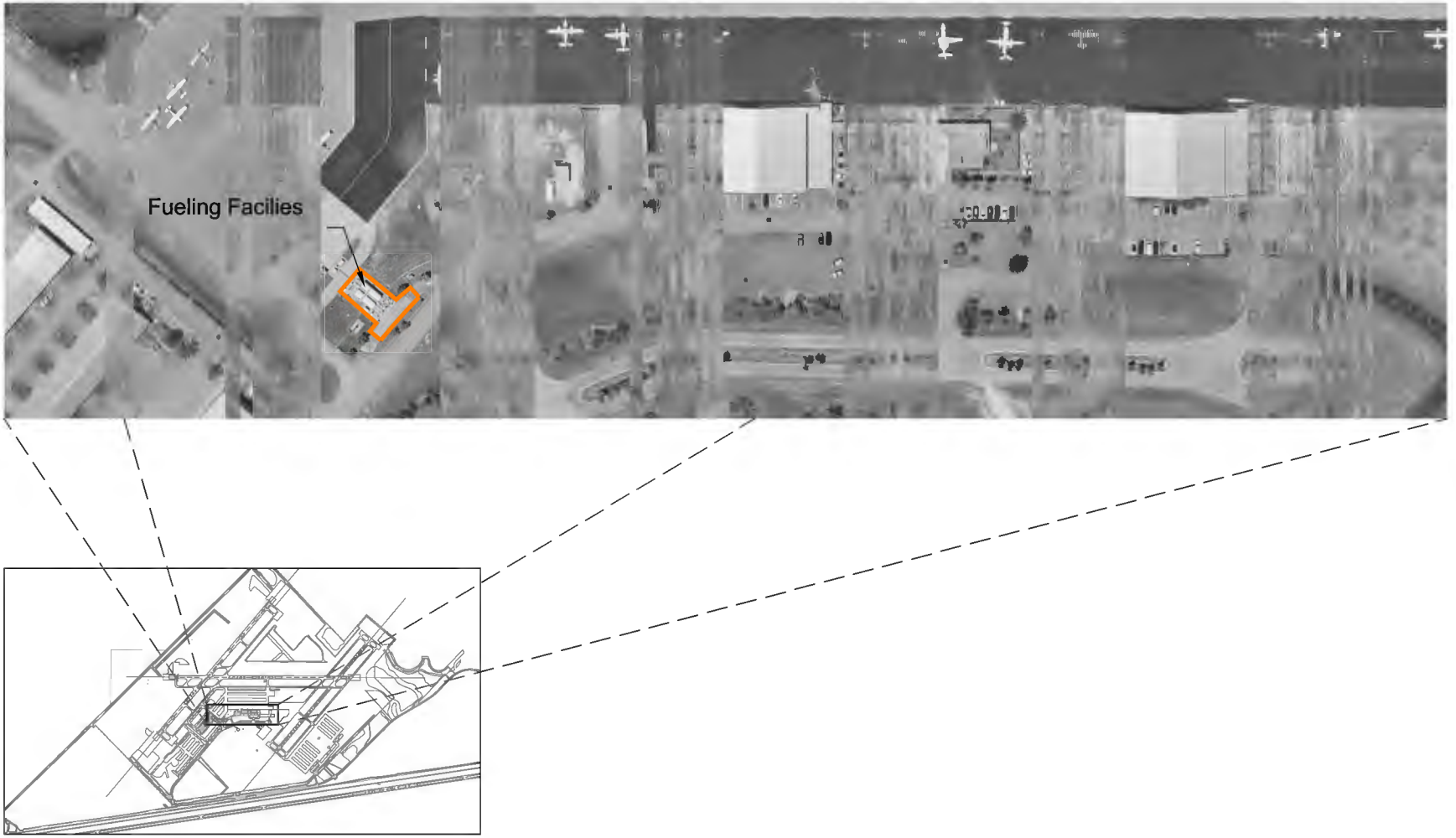
There are no Airport Rescue and Firefighting Facilities (ARFF) on the field; however, the Palm Beach County Fire Rescue Department provides firefighting support for F45. The Airport is County property and therefore the firefighting department must respond to fire on the Airport at all times. The nearest fire station is located approximately 10 miles from F45, at the intersection of Jog Road and the Bee Line highway.

As indicated in the Airport Master Plan Update report that was completed in 1996 by Williams, Hatfield & Stoner, Inc. and Aviation Planning, Inc., F45 also maintains a fire protection system consisting of two pumps, automatic controls, a hydro pneumatic tank, 8 inch and 12 inch pipelines, and 10 hydrants. Sprinkler systems also exist inside the FBO terminal building and corporate hangars.

3.3 Fueling Facilities

Aircraft fuel is provided through an agreement with Shell. Fuel is delivered by trucks that generally originate from Port Everglades. The fuel farm is located in the northeast quadrant of the ramp area, adjacent to the apron, and contains two above ground tanks, one 10,000 gallon AvGas tank and one 10,000 gallon Jet-A fuel tank. All fueling activities are conducted on the terminal ramp and are achieved using these trucks.

Landmark Aviation operates two fuel trucks, one AvGas truck with a 1,000-gallon capacity and one Jet-A truck with a 2,000-gallon capacity. To meet the continued increase in aircraft operations, the fuel farm is replenished a minimum of three times per month. **Exhibit 3-1** shows the location of the fueling facilities at the Airport.



Source: Aerial Photo, 2001; Ricondo & Associates, Inc., April 2006
Prepared by: Ricondo & Associates, Inc., April 2006

Exhibit 3-1

0 200 ft.

north

Fueling Facilities

Drawing: P:\PBIA\System Wide Airport Master Planning Study - Phase II\Task 2 - Inventory and Data Collection\Exhibits\NCO_Inventory Exhibits.dwg_Layout: 3-1 Fuel_Apr 26, 2006, 4:21pm

SECTION 4

Airport Access and Parking Facilities

4.1 Airport Access

F45 is located to the west of the Bee Line Highway (SR 710) and the C.S.X. railroad, between PGA Boulevard to the south and the C-18 Canal to the north. F45 has excellent regional access. Over the long term, however, access to the highway needs to be improved to minimize roadway crossings.

4.2 Airport Parking

Several public vehicle parking lots are located at F45, four of which are primary parking areas. The first area is located near the terminal building and serves the terminal, surrounding offices, and corporate hangars. There are 101 standard parking spaces provided in this area, as well as 13 handicap spaces. The second area is located on the east side of the airfield, east of the fuel farm, and adjacent to the conventional and t-hangars. This area provides 65 standard parking spaces, including four handicap spaces. The third parking area is located along the Airport entrance road, just north and east of the conventional hangars sited at the extreme east end of the hangar area north of Runway 8R/26L. This area includes 46 automobile parking spaces, seven of which are handicap spaces. The fourth area is located near the t-hangars on the north side of the airfield and serves the adjacent t-hangars. There are 80 standard parking spaces provided in this area, including 4 handicap spaces.

SECTION 5

Meteorological Conditions

5.1 Historic Weather Conditions

Meteorological conditions for this analysis are based on weather observations taken in the West Palm Beach area during the period 1996-2005. This data, obtained from the National Climatic Data Center (NCDC), consists of 84,031 hourly observations separated by visual meteorological conditions (VMC), instrument meteorological conditions (IMC), and "all weather" conditions as further described below. The hourly observations record data for ceiling heights, visibility, wind velocity, and wind direction, which was used to prepare wind roses for F45, as shown in **Exhibits 5-1** through **5-3**.

Meteorological conditions have a direct impact on the operational characteristics of the Airport. The conditions determine directions in which aircraft operate, the frequency of use of each operating configuration, and the instrumentation required in assisting pilots in landing and departing.

5.1.1 Ceiling and Visibility Conditions

Airfield and airspace capacity is impacted by the flight rules that aircraft operate under, which is governed by the ceiling and visibility conditions at the airport, due to differing spacing requirements.

Aircraft operate under two distinct categories of operational flight rules: visual flight rules (VFR) and instrument flight rules (IFR), which directly impact air traffic control procedures. These flight rules are closely related to the two categories of weather conditions: VMC (fair to good weather), and IMC (poor weather conditions with typically poor visibility). VMC is defined as conditions in which the ceiling is at or above 1,000 feet above ground level (AGL) and the visibility is at or above three statute miles. IMC exists whenever the ceiling drops below 1,000 feet AGL and/or the visibility is below three statue miles. In the West Palm Beach area, VMC occurs approximately 99 percent of the time, and IMC occurs approximately one percent of the time.

Aircraft may operate under VFR during VMC. In these conditions, the pilot is primarily responsible for seeing other aircraft and maintaining safe separation; navigation is typically performed by reference to geographic and other visual references. As a result, aircraft separation requirements are reduced, increasing airspace and airfield capacity as compared to IFR.

During IMC, aircraft operate under IFR. Air Traffic Control (ATC) is primarily responsible for aircraft separation and exercises positive control over aircraft during these conditions. In order to operate under IFR conditions, pilots must be certified instrument rated and meet proficiency requirements, and aircraft must meet certain minimum equipment requirements. Navigation is typically performed by the use of radio navigational aids and vectors from ATC, in addition to the use of ATC-assigned routes and altitudes. As a result

of the more stringent requirements due to limited visibility between aircraft, separation is increased during IMC which therefore reduces airspace and airfield capacity.

5.1.2 Runway Wind Coverage

Aircraft arrival and departure runways are determined by wind direction, as aircraft generally takeoff and land into the wind. Due to limitations by aircraft type with regards to maximum allowable crosswind[1] for takeoff and landing, strong crosswinds may result in pilots having to divert to another airport if there is not a crosswind runway available.

In order to quantify crosswind, pilots and airport planners calculate crosswind components based on wind direction and speed. Each aircraft type is certified to operate within a maximum crosswind component; larger, heavier aircraft are more resistant to wind and are generally able to operate with higher crosswinds, while smaller, lighter aircraft are more subject to wind and are therefore more restricted.

The FAA recommends that airports provide at least 95 percent wind coverage for planning purposes under the limitations as defined below. If a single runway does not provide at least 95 percent wind coverage for the airport reference code (ARC), a crosswind runway should be considered. The ARC for F45 is B-II.

- ARC A-I and B-I: 10.5-knot maximum crosswind component
- ARC A-II and B-II: 13-knot maximum crosswind component
- ARC A-III, B-III, and C-I through D-III: 16-knot maximum crosswind component
- ARC A-IV through D-VI: 20-knot maximum crosswind component

Table 5.1 summarizes wind coverage for F45, with crosswind components of 10.5 knots, 13 knots, 16 knots, and 20 knots. **Exhibits 5-1** through **5-3** graphically show coverage during good weather (VMC) conditions, poor weather (IMC) conditions, and all-weather conditions in the form of wind roses.

The main runway (Runway 8R/26L) provides more than the 95 percent coverage recommended by FAA for the 13-knot crosswind component under VMC. During IMC, the main runway provides less than the recommended 95 percent wind coverage; however, for all-weather combined, the wind coverage is again greater than 95 percent. Additionally, when considered together, the combined two runway system provides greater than 95 percent coverage for all weather categories, for all applicable crosswind components.

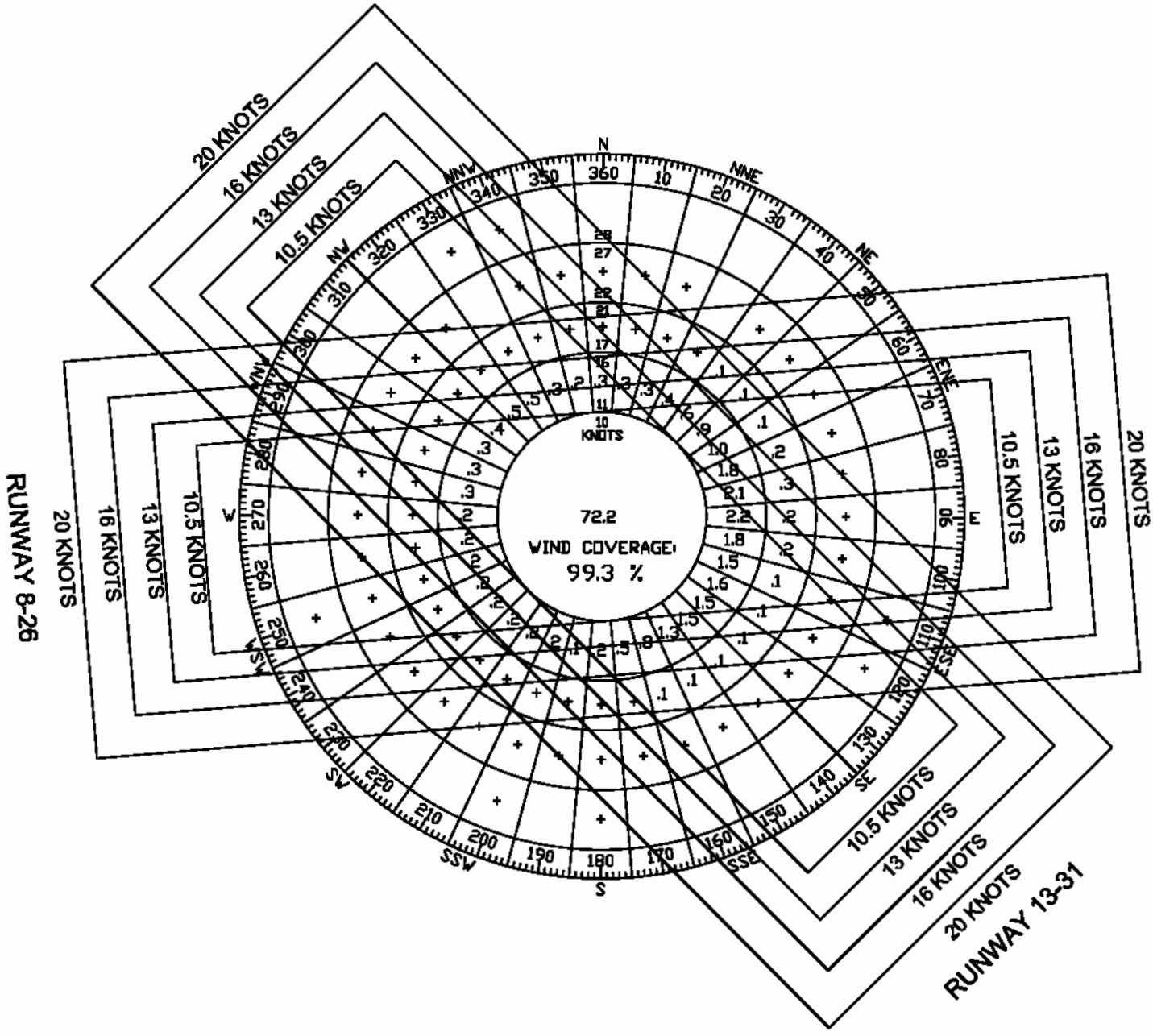
[1] Crosswind is the velocity of wind at a right angle to the runway, calculated from the wind speed and heading in relation to the runway.

TABLE 5.1

NCO WIND COVERAGE: VMC, IMC, and All-Weather

		VMC [1]				IMC [2]				All-Weather			
	True North	Ceiling ≥ 1000' and Visibility ≥ 3 miles				Ceiling < 1000' and Visibility < 3 miles				All Weather Observations Recorded in the Period			
	Heading	10.5 KTS	13 KTS	16 KTS	20 KTS	10.5 KTS	13 KTS	16 KTS	20 KTS	10.5 KTS	13 KTS	16 KTS	20 KTS
Runway 8	85	61.6%	64.9%	67.1%	67.5%	31.8%	34.0%	36.0%	36.7%	61.3%	64.5%	66.7%	67.1%
Runway 26	265	40.8%	42.0%	43.0%	43.1%	60.9%	64.0%	66.4%	67.5%	41.0%	42.3%	43.3%	43.4%
Runway 8-26 Combined	**-**	**91.7%**	**96.2%**	**99.6%**	**99.9%**	**84.4%**	**89.7%**	**94.1%**	**95.8%**	**91.6%**	**96.1%**	**99.2%**	**99.8%**
Runway 13	135	61.4%	65.3%	68.0%	68.6%	33.3%	35.3%	37.5%	38.7%	61.1%	64.9%	67.6%	68.2%
Runway 31	315	39.2%	40.5%	41.7%	42.0%	61.7%	63.9%	65.9%	66.6%	39.5%	40.8%	42.0%	42.3%
Runway 13-31 Combined	**-**	**89.9%**	**95.1%**	**98.9%**	**99.8%**	**86.7%**	**90.9%**	**95.0%**	**97.0%**	**89.9%**	**95.0%**	**98.9%**	**99.8%**
All Runways Combined	**-**	**98.0%**	**99.4%**	**99.9%**	**100.0%**	**94.0%**	**96.2%**	**97.5%**	**98.4%**	**97.9%**	**99.3%**	**99.8%**	**100.0%**

Source: CH2M HILL analysis based on National Climatic Data Center (NCDC) weather observations between 1996 and 2005 for the West Palm Beach Station #72203.



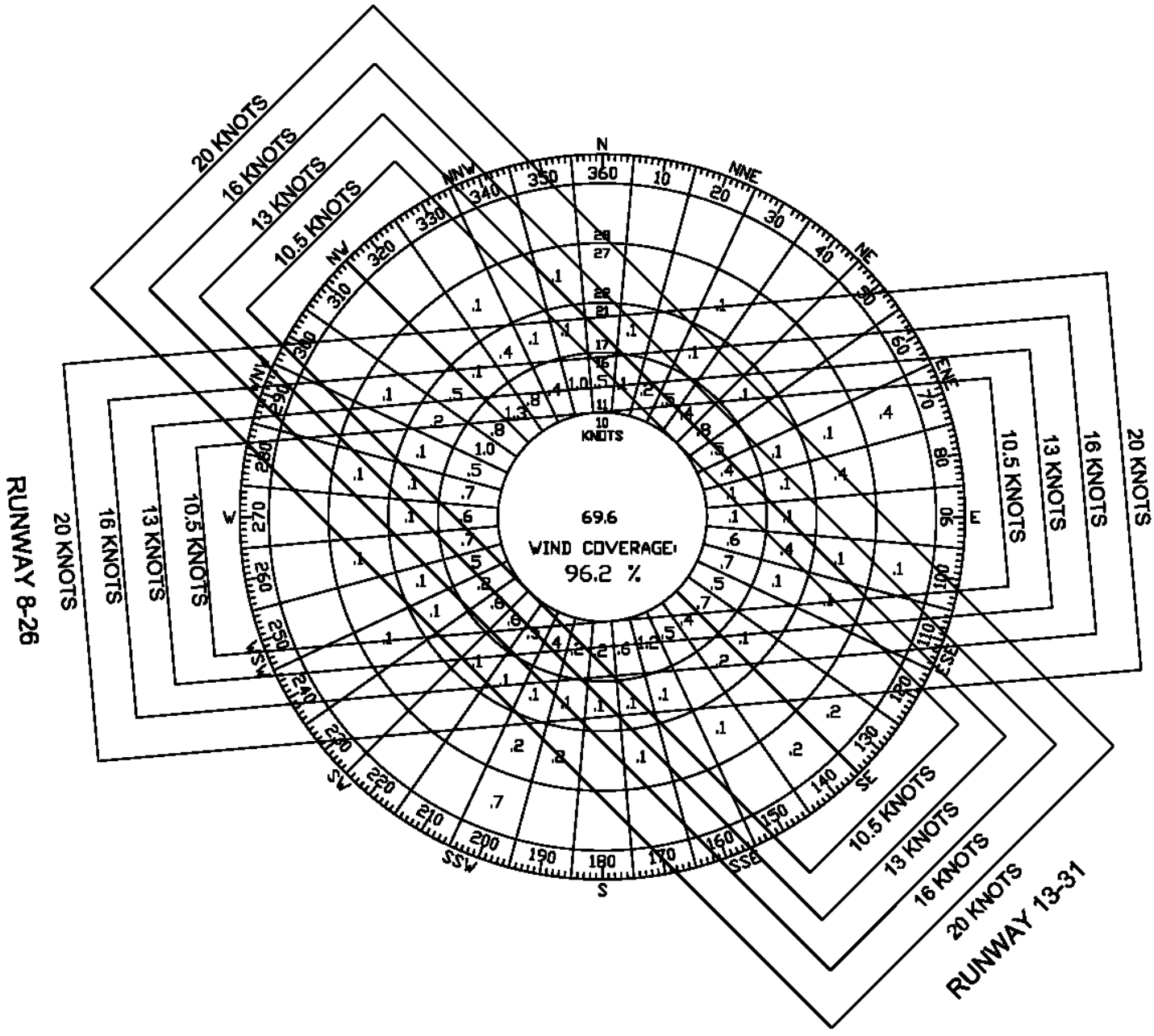
CH2MHILL

North Palm Beach County General Aviation Airport (NCO)

VMC Wind Rose

Exhibit 5-1

April 2006



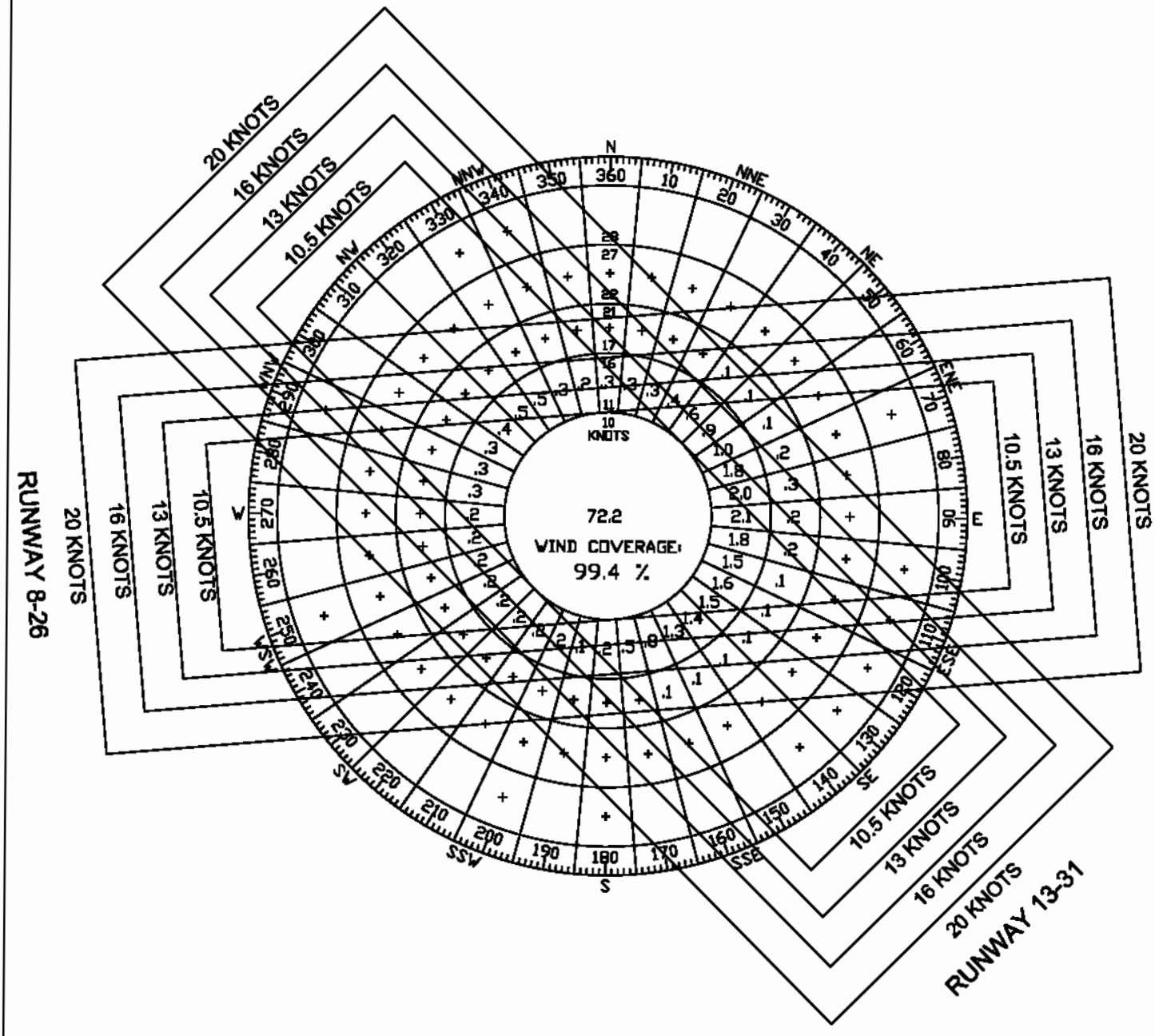
CH2MHILL

North Palm Beach County General Aviation Airport (NCO)

IMC Wind Rose

Exhibit 5-2

April 2006



CH2MHILL

North Palm Beach County General Aviation Airport (NCO)

All Weather Wind Rose

Exhibit 5-3

April 2006

Technical Report #2

North Palm Beach County General Aviation Airport Forecast

North Palm Beach County General Aviation Airport

Prepared for

Palm Beach County Department of Airports

DECEMBER 2005

CH2MHILL
In Association with Ricondo & Associates, Inc.

Contents

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SECTION 1

Introduction

Airport facility planning must begin with a definition of the projected aviation demand that may reasonably be expected to occur at the airport over a specific future period. For North Palm Beach County General Aviation Airport (F45), this involves the development of a 20-year forecast of aviation activity beyond the base year 2004 for 2005, 2010, 2015, 2020 and 2025. Forecasts of based aircraft, the based aircraft fleet mix, and annual aircraft operations, along with consideration of aviation activity peaking characteristics, will serve as the basis for airport facility planning.

Air transportation is a unique industry that has experienced wide fluctuations with periods of extensive growth and other periods when activity levels have experienced recession. In the general aviation arena, external factors such as product liability considerations, and the emergence of new means to access aircraft use (such as fractional ownership) have also contributed to the fluctuation in aviation activity. For this reason, it is important for an airport to reevaluate its current position and examine future demand trends and potential. In order to fully assess current and future aviation demand at F45, several key factors must be examined including:

- Historical trends at F45
- National and regional general aviation trends
- Historical and forecast socioeconomic and demographic information of the area
- Emerging business/development trends in the region
- Reliability of the historic base of data at the Airport

After examination of these considerations, a forecasting approach can be developed to addresses characteristics specifically related to F45. This approach will result in a more realistic basis for developing the aviation demand forecast.

SECTION 2

Historic Aviation Activity

The preparation of an aviation activity projection routinely uses a foundation of fundamental data, which includes a historical list of based aircraft (by aircraft type and operation). This list also includes type of activity, which, for a general aviation airport, is most often broken down into local versus itinerant operations. To ensure the accuracy of based data used in the forecast and to address potential inconsistencies, it is beneficial to examine multiple data sources to develop the most accurate historic information as possible. There is no air traffic control tower (ATCT) at F45, so only limited data are generally available related to aircraft operations. Existing activity data are based on estimates of activity provided by Piedmont Hawthorne the Airport's Fixed Base Operator (FBO). Three sources of data were consulted—the *2004 Florida Aviation System Plan* (FASP), the Federal Aviation Administration's (FAA) *Terminal Area Forecast* (TAF) and finally, interviews with the Airport FBO.

2.1 FASP Historical Data

The Continuing Florida Aviation System Planning Process (CFASPP) resulted in the development of the 2004 FASP and the Florida Aviation Database that includes historic operational and based aircraft data for every public-use airport in the State of Florida, along with forecasts of future activity at these airports. This information was reviewed to identify historic and projected levels of activity at F45. Since the opening of the Airport in 1994, the FASP indicates that the number of aircraft based at the Airport has increased significantly. **Table 2-1** shows the historical level of based aircraft and annual operations recorded for the Airport in the Florida Aviation Database and the 2004 FASP for the period 1994 through 2004.

From 1994 to 2004, based aircraft at F45 increased at an annual average growth rate of 16.8 percent, growing from a total of 40 based aircraft when the airport opened to 221 based aircraft based on an airport inspection in 2004. This increase in based aircraft levels reflects growth in overall aircraft in the Palm Beach area, as well as the relocation of aircraft from other nearby airports, notably Palm Beach International Airport (PBI) and Palm Beach County Air Park (LNA), to facilities at F45. The relocation of aircraft from other area airports was confirmed in discussions with representatives of the Airport's FBO.

The FASP also contained data on aircraft operations at airports in the State of Florida. Of interest is that FASP data indicated that while based aircraft have increased sharply, annual operations (as reported in the Florida Aviation Database) decreased at an annual average rate of 26.1 percent over the past 10 years (1995-2004). The dissimilarity between the number of based aircraft and the total number of operations brings into question the validity of these data. F45 has three active flight schools, and supports operations by aircraft activity that comes to the Airport to conduct training operations, as well as activity by a wide number of itinerant operators. There has been no identifiable anomalous reduction in operations and nothing that would indicate that activity at F45 differs from that experienced at other airports in the Palm Beach area or throughout the State of Florida.

TABLE 2-1
FASP Historical Based Aircraft and Aircraft Operations (1994 through 2004)

Year	Based Aircraft	Total Operations	Operations per Based Aircraft
1994	40	N/A	N/A
1995	95	74,850	788
1996	119	58,474	491
1997	143	61,322	429
1998	143	61,322	429
1999	146	61,322	420
2000	186	61,322	330
2001	191	74,870	392
2002	215	35,532	165
2003	221	36,506	165
2004[1]	221	36,506	165

Source: FDOT, Florida Aviation System Plan, 2004.
[1] Florida Aviation Database Inspection.

At most airports, and particularly in South Florida, as the number of based aircraft increases, so does the overall number of aircraft operations. There is no identifiable reason that can be cited that would indicate that F45 is any different. F45 does not have an ATCT, so operational levels are based on estimates that were provided by the FBO (see discussion below). FBO discussion provided no viable explanation for the basis of the sharp drop in activity indicated by the FASP data in 1995 and 1996, nor for the second more-significant drop in operations between 2000 and 2001.

While the effect of the September 11, 2001, terror attacks did impact aviation activity, decreases at other airports do not display the extent of impact presented in the estimated operational activity at F45. Based on the factors noted in the preceding discussion, it is believed that the estimates of operations displayed in the FASP data for F45 do not accurately represent actual operational levels at the airport. Given the lack of an accurate traffic count that would normally be provided by an onsite ATCT, it is more likely that annual traffic counts in the past have possibly been overestimated in the first years of the Airport opening and underestimated in the past 3 years. The basis for this belief will be discussed in subsequent text in this section.

2.2 FAA TAF Historic Information

A second source of based aircraft and operations information is the FAA's TAF, which displays a pattern of based aircraft growth and a decrease in operations, as shown in the FASP. There are some differences in the based aircraft data—notably in the initial years of F45 operating and also in the last 6 years, where based aircraft levels have been held generally constant at the 212 to 215 level. **Table 2-2** summarize the TAF data. The data obtained from the TAF show the

same inconsistencies and discrepancies that were noted in the FASP information and the same questions regarding the validity of the base data.

TABLE 2-2
FAA TAF Historical Based Aircraft and Operations (1994 through 2004)

Year	Based Aircraft	Total Operations	Operations per Based Aircraft
1994	119	N/A	N/A
1995	136	N/A	N/A
1996	136	58,474	430
1997	143	61,322	429
1998	143	61,322	429
1999	212	61,322	289
2000	215	61,322	285
2001	215	35,532	165
2002	215	35,532	165
2003	215	35,532	165
2004[1]	215	35,532	165

Source: FAA, 2005 TAF
[1] Estimate

2.3 Airport FBO Historic Data

Discussions were held with the Airport FBO to gain background about how the FBO developed the estimated activity levels. These discussions confirmed the data gathered from other sources and helped in assessing future changes in the number and type of based aircraft at the Airport.

Discussions with the management of the FBO indicated that their staff does not maintain any formal counts of activity and the estimates are based on observations of activity when staff is not busy with other responsibilities. Additionally, the estimates of activity are only for those hours that the FBO is operating, so some activities that occur outside of these hours may not be considered.

2.4 Summary

To summarize, both the FASP and the FAA TAF historic data indicated that the level of based aircraft at F45 has increased, while overall operations and operations per based aircraft have decreased sharply since the Airport opened. The basis for these historical numbers comes from the same source and, as will be discussed later in this report, the relationship between growing levels of based aircraft and decreasing total operations runs counter to the experience at a wide selection of general aviation airports throughout the State of Florida. Because of this anomalous relationship in the data displayed in the FASP and the TAF, it is believed that the historic operations levels at the Airport are unreliable and understate the actual activity levels.

SECTION 3

Forecasting Trends and Considerations

In preparing an airport forecast, it is important to have a general understanding of the events and trends that influence and guide the aviation industry as a whole and general aviation, in particular. It is also of value to consider how these factors influence activity in the smaller specific market area and region served by an airport. National general aviation trends provide insight as to possible impacts at F45. Regional economic and business trends, along with demographic changes, can also assist in the development of aviation demand forecasts for F45, as can conditions and characteristics at other potentially competing airports serving the same general area.

3.1 National General Aviation Trends

While the general aviation industry has been buffeted by a variety of adverse impacts over the past 25 years, resulting in reduced production of single-engine aircraft and some decline in the number of general aviation pilots, the industry has survived and a degree of stability within the basic structure of the industry is emerging. This stability is the result of actions by the U.S. Congress in the form of product-liability legislation, a number of measures implemented by industry groups, and changes in commercial aviation business models that have provided an impetus for stability and growth within the general aviation arena. The general aviation industry has undertaken efforts to expand its base and to bring new products, leadership, and pilots into the industry through an array of initiatives, research and development efforts, and the introduction of new roles and expansion of existing roles for general aviation.

As the entire aviation industry emerges from the effects of an economic recession and the terrorist attacks in 2001, new opportunities appear to be on the horizon for general aviation. This is not to say that general aviation is poised for massive expansion and growth, as some highly optimistic proponents of the industry might suggest, but it does suggest that credible and reasonable industry trends point to new areas of opportunity and an expanding role for general aviation that will allow it to serve communities--both large and small--in new ways. As a result, potential growth is seen for both the role and the level of activity at certain airports. The current general aviation industry forecasts identify some of the key emerging roles, opportunities, and factors that will influence the future complexion, role, and growth trends in the general aviation industry; as well as influencing the roles general aviation airports will play in serving local communities.

While a myriad of factors influencing general aviation can be considered, this section focuses on the more significant trends that are influencing the direction of general aviation. The major factors routinely identified by industry leaders as having the most significant potential influence on general aviation include:

- Continued growth in business and corporate use of general aviation
- Innovative ways of sharing the cost of aircraft ownership and/or new ways of accessing business aircraft

- Potential expanded use of general aviation as an alternative to commercial passenger airline use by corporate travelers
- Industry promotion of learn-to-fly programs, including the introduction of the Sport Pilot License
- Pending introduction of very light jet (VLJ) aircraft, consisting of relatively inexpensive jet aircraft
- Future role, if any, of the Small Aircraft Transportation System (SATS) in the United States

To varying degrees, each of these influences has been considered in the forecasts of general aviation activity, such as those prepared annually by the FAA. However, because several of the noted trends (such as SATS and the introduction of very light jets) are just beginning to emerge, their full effect is speculative and industry forecasters have tended to approach the potential influences of these opportunities from a conservative standpoint. This conservative approach should be kept in mind when considering current long-term forecasts of general aviation activity prepared by the FAA, since not only the positive influences driving activity growth were considered, but also such influences as rising fuel prices, weakness in the current economic recovery, and recent decreases in projected levels of corporate profitability, all of which can contribute to limiting growth in general aviation.

The most recognized industry-wide forecasts are those prepared by the FAA in its annual Aerospace Forecasts. These forecasts were most recently updated in March 2005. The FAA Aerospace Forecasts for Federal Fiscal Years 2005-2016 (for 12-month periods, October through September) provide historical and forecast data for all segments of the aviation industry and are used by the FAA in its facility planning and staffing. The FAA notes the benefits of the General Aviation Revitalization Act of 1994 (GARA), which brought product liability reform to the general aviation aircraft industry. Before passage of that legislation, general aviation aircraft shipments had declined from approximately 18,000 aircraft annually in 1978 to just 928 aircraft in 1994, with a complete cessation of the manufacture of single-engine piston aircraft by major U.S. aircraft companies such as Cessna, Beechcraft, and the Piper Aircraft Company.

While manufacturing of general aviation aircraft since passage of the legislation has not approached the number manufactured in the late 1970s, liability reform has resulted in a number of aircraft manufacturers (Cessna, Beechcraft, Piper) restarting their production of single-engine piston aircraft, adding approximately 25,000 new manufacturing jobs in the industry. Additionally, passage of GARA resulted in a number of new aircraft manufacturers entering the general aviation market. While the period from 2001 to 2003 was difficult for the general aviation industry, the FAA notes that "the market for general aviation products and services staged a relatively strong recovery in 2004. Promise of future growth is evidenced by the general aviation industry's development, production and introduction of new products and services." Some of these new products and services include high-end business jets, fractional ownership of aircraft, on-demand charter models, and the lower-cost VLJs.

Furthermore, FAA notes in its Aerospace Forecasts the continued resilience of the general aviation piston market, an area of aircraft manufacturing that many [in the aviation industry] in the late 1980s, and even after passage of GARA in 1994, thought to be in a steady state of decline. Over the last 20 years, growth in the general aviation aircraft fleet has been fueled almost exclusively by increased demand and production of turboprop and turbine-powered jet

aircraft primarily serving the business aviation market in the United States, while the piston market has decreased. While the turbine-powered fleet is still projected to experience the strongest growth over the 11-year forecast period, the FAA is suggesting that the introduction of new models of single-engine piston aircraft appears to be generating interest in the "low end" of the market for general aviation aircraft. This interest has been masked in the past. A review of U.S. registered aircraft data focusing on the single-engine category identifies that this fleet consists of a high percentage of older aircraft, including many 1950s and 1960s models. It is believed that a significant share of the new aircraft being produced have been acquired not by new owners of aircraft, but rather by owners of older aircraft who are upgrading and retiring their former aircraft. Thus, while sales had been occurring, there was not a noticeable increase in the number of single-engine aircraft in the fleet until recently.

The current FAA Aerospace Forecasts indicate limited growth in the single-engine piston fleet from 2005 through 2016. It is anticipated that the trend of replacing older-model aircraft will continue and that, overall, the number of single-engine piston models in the general aviation fleet will increase slightly over their 11 year forecast period. The FAA projects a 0.2 percent average annual growth in active single-engine aircraft, increasing from 143,916 in 2003 to an estimated 148,000 by 2016. Over this same time frame, the FAA forecasts that the number of active multi-engine piston aircraft will decline 0.2 percent per year, from a total of 17,723 in 2003 to 17,235 in 2016. A key contributing factor to this decline is the availability of new competitively priced single-engine higher-performance turboprop aircraft and the emerging introduction of the VLJ, which is priced to compete with many twin-engine piston aircraft variants.

Historically, forecast growth in the general aviation industry has been based on the expansion of the fleet of turbine-powered aircraft, both turboprops and jets. During the period when the major aircraft manufacturers ceased production of single-engine aircraft, it was the turboprop and jet market that kept these companies in business. The FAA continues to forecast strong growth in this segment of the general aviation industry; however, they have tempered their projections of growth in the turbo-prop segment, indicating that this segment will increase 1.2 percent per year, or approximately 100 aircraft per year. This is lower than FAA projections that were developed in the late 1990s, in which annual growth rates of 3 to 4 percent were common. The basis for the modest expansion in forecast of turboprop aircraft is tied, in part, to the anticipated competition posed by the introduction of twin-engine VLJ models priced from $1 to $3 million. These aircraft, priced close to, and in some cases less than, competing turboprop models, will offer a higher operating ceiling, excellent short-field capabilities (designed to operate on runways of 4,000 to 6,000 feet) and the added speed of a jet. The first VLJ model is anticipated to enter the fleet in 2006 with subsequent models being added in the years immediately thereafter. Currently, there are several VLJs conducting flight tests and as many as five other models in varying stages of design and development. Two VLJ manufacturers, Adams and Eclipse, indicate that they each have signed orders for more than 200 aircraft. Manufacturers of these aircraft, which include Cessna, have identified not only current owners of twin-engine piston aircraft as one of the key markets for these models, but also are marketing to the owners of single-engine and twin-engine turboprop aircraft.

Consistent with previous FAA and other industry forecasts, including those prepared by the General Aviation Manufacturers Association (GAMA), the greatest anticipated growth rate is forecast to occur in the turbojet category of general aviation. Growth in the active fleet of

general aviation jet aircraft is forecast at an average annual rate of 5.4 percent, with total general aviation jet aircraft increasing from 8,153 in 2003 to an estimated 15,900 by 2016. This growth recognizes the FAA's perception of the impact of the VLJ, as well as the introduction of an array of new jet aircraft entering the fleet, including models in the small, mid-range and a number of high-end models. The FAA notes that some of the other factors contributing to its forecasts are the continued growth in fractional ownership of general aviation jets, and a continuation in the shift from commercial air travel to corporate/business air travel by corporations who have opted for general aviation because of the ability to avoid congested hub airports, minimize delay and disruption to travel plans often occurring on commercial flights, and the ability to make productive use of travel time while using a corporate aircraft.

Overall, the most current FAA forecasts predict a growth rate in the active general aviation aircraft fleet of 1.1 percent annually, from an estimated 210,600 total aircraft in 2003 to 240,076 total aircraft in 2016. The FAA rate of growth is slightly below that anticipated by GAMA, which forecasts the general aviation fleet to grow to 246,415 aircraft by 2015. The key element in this information is that all industry forecasts point to growth in the overall number of aircraft and, in particular, all show growth in the lower end of the market (single-engine piston/light sport aircraft) as well as at the upper end of the spectrum (business jets). In addition to growth in the number of aircraft in the fleet, both the FAA and the GAMA forecast overall growth in the number of hours flown by general aviation aircraft from 2005 through 2015/2016. Both entities forecast that all segments of the general aviation aircraft fleet will experience increases in the number of hours flown, the sole exception being the multi-engine piston segment, which is forecast to decrease 0.3 percent annually over the forecast period.

Thus, while recognizing that other factors could affect future activity levels, including a weakened economic recovery and rising fuel prices, both the FAA and the GAMA, along with such other entities as engine manufacturer Rolls-Royce, plc, forecast continued steady growth in the fleet and in the use of general aviation. The forecasts prepared by these various industry entities balance the potential adverse considerations with the more optimistic perceptions regarding a number of emerging factors that are believed to positively influence the rate of growth. In short, current forecasts are neither overly negative nor overly positive. The FAA notes that it has taken a relatively conservative position relative to the effect that the development and potential applications of VLJs might have on the industry. The approach employed by the FAA and others is reasonable and considers both the positive effects of past developments and an understanding that the actual effects of any new trend cannot be accurately measured until some experience has been gained.

3.2 Local Area Trends

Local area trends that influence aviation activity can include such items as overall population of the general area served by the airport, employment trends, income considerations, along with other more intangible considerations (pending major development activity, significant changes in the location of economic or business activity within a region, and constraints that limit other airports from being able to accommodate additional growth). A number of these considerations come into play when considering future activity at F45, as discussed below.

3.2.1 Regional Socioeconomic Data

Palm Beach County lies along the southeast Florida coast extending from Jupiter to the north to Boca Raton to the south, and from the Atlantic Ocean west to the eastern shore of Lake Okeechobee. Palm Beach County encompasses 2,203 square miles and is bordered by Martin County to the north, Broward County to the south, the Atlantic Ocean to the east, and Glades and Henry Counties to the west. Some of the more significant neighboring cities include Fort Lauderdale/Hollywood/Pompano Beach and Miami to the south, and Jupiter/Stuart and Fort Pierce to the North. Access among the communities and Palm Beach is provided by various local and state roadways as well as via Interstate 95 and the Florida Turnpike. Within the boundary of Palm Beach County lie the communities of Belle Glade, Boca Raton, Boynton Beach, Canal Point, Delray Beach, Lake Worth, Loxahatchee, Palm Beach, Palm Beach Gardens, Riviera Beach, Royal Palm Beach, Wellington, and West Palm Beach, along with significant unincorporated, yet fully developed residential, commercial and industrial areas. Additionally, the County retains a significant amount of acreage that has not yet been developed, but has the potential to accommodate significant growth.

Socioeconomic factors that were reviewed and considered in this study included population change, per capita income, changes in employment levels, and construction indicators. All of these factors have been found to potentially affect the level of activity at an airport. Projected growth in one or more of these indicators can often provide a correlation to growth in aviation activity. For example, public use airports are typically found serving a base of population and, routinely, the larger the community, the greater the level of activity at the associated airport. The identified indicators will be discussed in greater detail below.

3.2.1.1 Population

The size and changes of local population often relate directly to the size of the pilot population and the extent of aircraft ownership within a given market. Aircraft ownership is typically associated with a small portion of the total population. As a result a larger population base generally results in a greater likelihood of increased aircraft ownership, particularly when other factors such as income and a strong business or tourism base is also present. As shown in **Table 3-1**, the overall population in Florida has steadily increased at an average annual growth rate of 2 percent from 1990 through 2004, a rate that is lower than Palm Beach County, which experienced a population growth rate of 2.58 percent during the same time period. The state's continued population increase is mainly a result of high rates of net in-migration. The major reasons for net in-migration into Florida include job opportunities and the generally favorable climatic conditions. Between 1994 and 2004 the total population of Palm Beach County grew by 255,000 new residents

TABLE 3-1
Historical and Projected Population (in thousands)

Year	Palm Beach County	State of Florida
1994	988	14,239
1995	1,014	14,537
1996	1,040	14,853
1997	1,070	15,186

TABLE 3-1
Historical and Projected Population (in thousands)

Year	Palm Beach County	State of Florida
1998	1,096	15,486
1999	1,117	15,759
2000	1,136	16,051
2001	1,161	16,363
2002	1,188	16,691
2003	1,216	17,019
Base Year		
2004	1,246	17,206
Forecast		
2005	1,278	17,555
2010	1,434	19,339
2015	1,588	21,178
2020	1,745	23,143
2025	1,907	25,231
Average Annual Growth Rate		
1990-2004	2.58%	2.0%
2005-2025	2.02%	1.83%

Source: National Planning Association.

Projections of future population levels developed for the period 2005 through 2025 indicate that the state population is expected to continue to experience a steady 1.83 percent annual average growth rate. Palm Beach County is also projected to continue to experience an increase in population with an annual average growth rate of 2.02 percent through 2025.

Unlike Broward and Dade Counties further to the south, Palm Beach County does not experience the extent of limitation to future development that is posed by proximity to the Everglades and the Everglades National Park. A large portion of the western half of the county consists of agricultural uses associated with extensive sugar farming activities and the potential constraint to development stemming from large-scale wetland systems is less evident. Thus, there remains considerable opportunity for growth and development in the County, a significant share in the same general portion of the County as F45.

3.2.1.2 Per Capita Income

Ownership and operation of an aircraft is not an inexpensive activity and in considering the potential for growth in the ownership and operation of aircraft, particularly by individuals, income has been shown in studies by the FAA to be a key determinant. For this reason, indicators of potential changes in income levels, such as changes in disposable personal income or fluctuations in per capita personal income within a market area, are reviewed.

Per capita income can be a valuable indicator of economic conditions for a particular area. Strong income coupled with strength in overall employment levels and specific categories of employment are needed to support both business and recreational aircraft ownership and use. The figures in **Table 3-2** represent the ratio of total personal income, from all sources and before income taxes, to total resident population for Palm Beach County.

TABLE 3-2
Historical and Projected Per Capita Income

Year	Palm Beach County	State of Florida
1994	$36,885	$24,467
1995	$37,882	$25,050
1996	$38,867	$25,558
1997	$39,096	$26,079
1998	$40,652	$27,143
1999	$41,002	$27,536
2000	$41,752	$28,235
2001	$42,591	$28,359
2002	$42,657	$28,771
2003	$41,196	$28,279
Base Year		
2004	$42,615	$29,689
Forecast		
2005	$43,515	$30,580
2010	$47,291	$34,478
2015	$49,885	$37,559
2020	$51,912	$40,174
2025	$53,882	$42,658
Average Annual Growth Rate		
1990-2004	0.89%	1.31%
2005-2025	1.07%	1.68%

Source: National Planning Association

In 2004, per capita income in Palm Beach County was $42,615, far exceeding the state of Florida figure of $29,689 for the same year. The high per capita income in Palm Beach can be attributed to the percentage of high-income households located within the County, particularly along the Atlantic coast, and the overall strength of the employment sector in the County. Overall, per capita income levels within the county and for the state as a whole are anticipated to increase over the 20-year planning period at an average annual growth rate of 1.07 percent and 1.68 percent, respectively. While the percentage average annual rate of increase in statewide per capita income exceeds that of Palm Beach County, Table 3-2 clearly shows that the level of income as expressed in dollars in the County remains approximately 25 percent above that of the state of Florida.

3.2.1.3 Employment Indicators

As previously alluded to, the level of employment provides another perspective into the economic stability of a given geographic area and the propensity for aviation to play a role in association with the businesses generating the employment in the area. Employment data, as with income, identify both past and potential future economic trends. As seen in **Table 3-3**, employment levels in the state have steadily increased over the 14-year period at an annual average growth rate of 2.53 percent, while the rate of employment growth in Palm Beach County has outpaced the state, averaging a 3.25 percent annual rate of expansion. The State of Florida experiences a significant amount of employment growth in lower-paying services industry and tourism services sectors and, to some extent, the rate of growth in Palm Beach is partially fueled by growth in the same sectors. However, the employment level rise is also attributable to expansion in other sectors in the County as a result of highly successful ongoing actions to diversify and expand the local economy in Palm Beach County. Key among the local industries generating the growth in employment levels include tourism, agribusiness, communications and information technology, medical/pharmaceutical manufacturing, aerospace engineering, and business/financial services.

TABLE 3-3
Historical and Projected Employment (in thousands)

Year	Palm Beach County	State of Florida
1994	494	7,213
1995	512	7,482
1996	538	7,742
1997	561	8,023
1998	586	8,325
1999	610	8,582
2000	639	8,861
2001	661	8,988
2002	676	9,092
2003	690	9,239
Base Year		
2004	715	9,519
Forecast		
2005	743	9,853
2010	869	11,354
2015	981	12,722
2020	1,077	13,962
2025	1,170	15,180
Average Annual Growth		
1990-2004	3.25%	2.53%
2005-2025	2.30%	2.18%

Source: National Planning Association

The data in Table 3-3 indicate that the projected number of employed persons in the county and the state will continue to increase over the planning period. The growth rate associated with the number of employed people in Palm Beach County is expected to increase at a higher rate than the state growth rates over the 20-year planning period. A portion of the increase in employment in the County will be associated with the ongoing development of the Scripps Research Institute, which currently is developing its facilities and additional sites for spin-off bio-technology business approximately 5 miles to the west of F45. When completed, the Scripps Institute will be just one component of the Palm Beach County Technology Park that will encompass several thousands acres, including an estimated 1,900 acres of land devoted to high technology/biotechnology activities, similar to the facilities and the wide variety of affiliated spin-off uses that have grown up in the immediate vicinity of the Scripps Institute in California.

3.2.2 Business Development

As noted earlier, another factor that contributes to the potential level of activity at an airport can be the extent to which the facility serves existing, or may serve future, centers of professional and business activity. An example of the influence that proximity to business centers can be found in the origination and development of Spirit of St. Louis Airport (SUS). When originally established in western St. Louis County, Missouri, SUS was surrounded by nothing but rural farmland. Over time, as urban development activity moved west in St. Louis County, SUS became one of the primary centers for corporate aviation with significant growth in the number and in the sophistication of the fleet of aircraft operating from the facility. It is generally agreed that the location of the airport was a key contributor to the emergence of the western St. Louis County vicinity as a primary center of business and industrial activity. Today, SUS is located in the center of one of the premier commercial and industrial areas in the metropolitan St. Louis region and has become home to approximately 500 based aircraft, including the corporate flight departments of Anheuser-Busch, Monsanto Chemical, Emerson Electric, and numerous other smaller corporate and private aircraft owners. The development and characteristics of SUS share a number of similarities with those associated with F45, including initial development in an undeveloped rural area and the emergence of significant commercial and industrial development, with the airport being located strategically to serve in a key supporting role for the commercial and industrial uses.

A major high technology development initiative by Palm Beach County and the State of Florida has resulted in a successful effort to develop what will be one of the most significant high-technology research and development parks since the emergence of the North Carolina Research Triangle area. The Scripps Research Institute (TSRI) is one of the world's largest private, non-profit, biomedical research organizations. Currently located in La Jolla, California, a community north of San Diego, its existing facilities include 16 laboratory buildings with more than 1 million square feet of space. Researchers at TSRI focus primarily on the following seven fields of study: cell biology, chemistry, immunology, molecular biology, molecular and experimental medicine, neurobiology, and neuro-pharmacology. TSRI also operates several education outreach programs.

TSRI is establishing a major science center in Palm Beach County, Florida, focusing on biomedical research, technology development associated with the medical industry, and drug design. TSRI routinely teams with a large variety of leading business and universities that specialize in the medical, pharmaceutical, and bio-technology arena as a part of their research

programs; many of these entities make use of corporate aircraft in the daily activities. Funding for facilities and initial staffing is supported by the State of Florida via economic development funds, as well as by the local county government.

The expansion is expected to spur Florida's economic development in biotechnology, just as Scripps in La Jolla has served as the impetus and economic stimulus for a burgeoning bioscience industry in San Diego. Economists predict that Scripps Florida will create 6,500 new jobs during the next 15 years and will position Florida as a leader in biomedical research, generating $1.6 billion in additional income to the state of Florida through the ultimate creation of up to 44,000 new jobs and by boosting the state's gross domestic product by $3.2 billion. These estimates are predicated on Scripps repeating its California experience, where 499 biotechnology businesses have been established in San Diego--80 percent of them within a 3-mile radius of the La Jolla campus.

TSRI has already initiated activity in Florida, although on a limited basis until its new research facilities are developed. In Spring 2005, Scripps Florida began operations in a relatively small facility at Florida Atlantic University in Boca Raton and expects to move to a new 40,000-square-foot laboratory building on its north campus in Jupiter in 2005. Plans are being finalized for the development of a permanent, state-of-the-art research facility on a 1,919-acre campus in Palm Beach County, which is planned as the focus of an innovative mixed-use community of residents, biotechnology and pharmaceutical companies, retail and recreational outlets, and cultural and educational facilities, with the appropriate infrastructure to accommodate further expansion. The TSRI permanent campus and the associated spin-off high-technology uses are being planned and developed approximately 5 miles due west of F45.

In addition, every institution of higher learning in Florida has been invited to form collaborative partnerships with Scripps Florida, beginning with Florida Atlantic University. The institute will begin offering Ph.D. programs in Palm Beach County as part of its core mission. Scripps Florida will extend its community outreach activities in the secondary education community throughout Palm Beach County.

As mentioned above, Scripps Florida will be a magnet for many small and large businesses as well as other research institutions, laboratories, and universities. A review of the various educational and business entities that have existing relationships with TSRI in its ongoing research and development initiatives include such entities as Johnson and Johnson, Pfizer, Novartis, Proctor and Gamble, Merck, and a number of other major medical and pharmaceutical firms in the U.S. and overseas. While the specific extent of aviation activity that might be generated by the development of TSRI and the array of spin-off technology businesses cannot be definitively established, it is evident that a number of the firms that typically work in concert with TSRI use corporate aviation in their day-to-day activities and would likely do so at F45 given its proximity to the future TSRI facilities. Thus, it is anticipated that development of TSRI will increase aircraft activity at F45 as businesses use their corporate aircraft fleet. **Table 3-4** lists a sample of biotechnology and pharmaceutical companies, their base of operations, and aircraft type as defined through a search of JP Fleets, 2005 Bizjet, and the Turbo-prop database. There are a number of other potential users from universities and major medical facilities that employ a mix of small to mid-sized business jets that are also deemed likely to interface with the Scripps Institute and would be likely to make use of F45.

When considering future activity levels of F45, the factors noted above as potentially contributing to aviation use need to be considered both individually as well as in combination. The influence that the historically high per capita income levels have on the propensity to make use of aviation resources, including general aviation, supports the contention that Palm Beach County residents do possess a level of disposable personal income that renders their use of aviation a more likely event than in areas having much lower income levels. The influence that the development of a world-class biotechnology and pharmaceutical research park, that should bring similar, if not greater, development to what has taken place at the southern California Scripps Institute, will also shift demand patterns and will result in greater interest in F45. It will also create a need for F45 to be configured to provide a viable level of service to support the array of general aviation aircraft that are typical to the corporations and research entities that routinely interface with TSRI. Finally, as TSRI develops, there will be ancillary and affiliated growth in the area surrounding F45 that may only be partially addressed in the current projections of population. This growth will consist of commercial and industrial activities, as well as an expansion of housing opportunities for individuals moving to Palm Beach County and those who will be working at one of the multitude of businesses facilitated by the development of TSRI. With this expansion of population, added professional employment, and potential enhancement to the area's income, comes a desire by those residents who own or use general aviation to base their activity out of F45, as opposed to using one of the other airports in the County or the immediately adjacent counties.

TABLE 3-4
Biotechnology and Pharmaceutical Company Aircraft Fleets Likely to Use F45

Company Name	Base of Operations	Aircraft Type
Abbott Laboratories, Inc.	Waukegan, IL	Raytheon Hawker 800XP Bombardier GIV-SP Bombardier GIV Beech King Air 350
Amgen, Inc.	Thousand Oaks, CA	Bombardier GIV-SP Gulfstream GV
Aventis Pharmaceuticals, Inc.	Allentown, PA	Gulfstream GV
Baxter Healthcare Corp/ Allegiance Healthcare	Waukegan, IL	Dassault Falcon 900
Bristol-Myers Squibb Co.	White Plains, NY	Bombardier GV
Eli Lilly & Co.	Indianapolis, IN	Bombardier GIV
Health Transportation Services Corp	White Plains, NY	Gulfstream GIV
Johnson & Johnson	Mercer County, NJ	Gulfstream GIV-SP Raytheon Hawker 800 A
Merck & Co.	Mercer County, NJ	Dassault Falcon 50EX Dassault Falcon 900EX
Novartis Services Inc.	New York City, NY	Bombardier Learjet 55B
Pfizer Inc.	Mercer County, NJ	Gulfstream GV
Proctor & Gamble Pharmaceuticals Inc.	Norwich, NY	Cessna Citation II
Roche Biomedical Lab, Inc.	Burlington, NC	Beech King Air B100

TABLE 3-4
Biotechnology and Pharmaceutical Company Aircraft Fleets Likely to Use F45

Company Name	Base of Operations	Aircraft Type
Rohrer Corp.	Wadsworth, OH	Cessna Citation II
Salter Labs	Arvin, CA	IAI Westwind 1124
Triad Hospitals Inc.	Dallas, TX	Cessna Citation X Cessna Citation Encore
United Healthcare	St. Paul, MN	Gulfstream GV Gulfstream G550 Bombardier Challenger 604
Vanguard Health Management Inc.	Nashville, TN	Dassault Falcon 20F-5

Source: JP Biz-Jet 2005 Turboprop, 38th Edition.

SECTION 4

Previous Aviation Activity Forecasts

Since the opening of the Airport in 1994, four separate aviation activity forecasts have been prepared for North County Airport. These studies include the 2004 *North County General Aviation Vision*, the 1996 *Master Plan Update*, the 2004 *FAA Terminal Area Forecasts* (TAF), and the *2004 Florida Aviation System Plan* (FASP). Although new forecasts are generated as part of this analysis, data contained in previous studies typically proves valuable for purposes of comparison. Information from these other forecast efforts was consulted and considered in the development of the basis for the projections contained in this update.

4.1 North County General Aviation Vision

The *North County General Aviation Vision* was prepared in 2004. This document identified three forecasting scenarios: low, moderate, and high growth. Multiple regression analysis was not performed based on the presumed lack of correlation that would result from the unreliability of the historic operations data and supporting information; therefore, previous studies and other documents were used to forecast based aircraft and operations. The low-growth scenario assumed that future growth at F45 would occur at a slower rate than the previous Master Plan growth rate of 2.8 percent, which, while defining the low-growth scenario, was above the rate of growth forecast for general aviation in national forecasts. The moderate-growth scenario projected that growth of operations and aircraft at F45 would expand at a rate closely resembling the FASP and previous Master Plan projections. The moderate-growth scenario was based on a projected annual rate of growth of 3.3 percent. The final projection developed as a part of the study consisted of a high-growth scenario that assumed that F45 would undertake improvement to its facilities to accommodate a larger number of aircraft, envisioned a strong recovery of the U.S. economy, and a fuel price decrease. This scenario also assumed that F45 would capture a relatively high share of the traffic expected to fly into and out of PBI. **Table 4-1** shows the low-, moderate-, and high-growth scenario projections.

TABLE 4-1
North County General Aviation Vision Forecasts

	Low-Growth Demand Scenario		Moderate-Growth Demand Scenario		High-Growth Demand Scenario	
Year	Based Aircraft	Total Operations	Based Aircraft	Total Operations	Based Aircraft	Total Operations
2008	243	115,812	255	121,188	252	119,702
2013	279	135,846	297	144,007	299	144,931
2018	321	156,218	346	167,905	355	172,134
2023	368	179,172	403	195,288	422	203,960
Average Annual Growth Rate	2.8%		3.3%		3.5%	

Source: The LPA Group Incorporated.

Based on the three growth scenarios, operational activity would reach 179,172 annually in 2023 under the low-growth scenario, 195,288 under the moderate-growth scenario, and 203,960 based on the high-growth concept. Operations per based aircraft actually expanded more quickly under the low-growth scenario than under the moderate- and high-growth scenarios with operations per based aircraft in 2008 being estimated at 475 (low growth) and 476 (moderate and high growth), and increasing to 487 (low growth), 485 (moderate growth), and 483 (high growth) by 2023 under this forecast analysis.

4.2 1996 Master Plan Update

Ricondo & Associates, Inc. completed the F45 *Master Plan Update* in 1996. The number of based aircraft and total annual operations projected are shown in **Table 4-2**.

TABLE 4-2
1996 Master Plan Forecasts

Year	Based Aircraft	Total Operations
Base Year		
1995	186	74,850
Forecast		
2000	240	96,600
2005	270	108,700
2010	300	120,800
2015	340	136,800

Source: Ricondo & Associates, 1996, *Master Plan.*

Based on the forecasts reflected above, based aircraft for F45 were projected to increase from 186 aircraft in 1995 to 340 in 2015, representing an annual average growth rate of 5.24 percent from 1995 to 2000, and 2.38 percent from 2000 to 2015. Ricondo & Associates, Inc chose to apply two different average annual growth rates over the planning period, assuming the airport will attract a significant portion of those aircraft based at PBI and neighboring airports in the first 5 years following the opening of the airport. For the reminder of the planning period, Ricondo & Associates, Inc. assumed that the based aircraft growth would follow the projection of similar airports located in South Florida. Thus, a more conservative annual average growth rate of 2.38 percent, as developed in the *Florida Aviation System Plan South Florida Metropolitan Area 1992-2010* forecast, was used.

The forecast of annual operations was based on the review of aircraft operations per based aircraft at Boca Raton, Palm Beach County Park, and Witham Field. Based on the data sets from these three airports, an averaged ratio of itinerant and local operations per based aircraft was determined, and then applied to the forecast of based aircraft demand at F45 for the selected 5-year time frames over the forecast period. The operations per based aircraft value were held constant at 402 annual operations per aircraft over the 20-year forecast period. The projections of annual aircraft operations assumed that the ratio of itinerant and local operations per based aircraft would remain constant over the planning period.

4.3 Florida Aviation System Plan

The FASP is a broad blueprint planning process that is used as a guide for the development of Florida's public airports. This plan is intended to ensure that airports work together effectively as a statewide transportation system, provide a link to the global air transportation network, and effectively interface with regional surface transportation. As such, the Aviation Office of the Florida Department of Transportation (FDOT) developed activity forecasts as an element of their system planning activities for the public airports in the state.

The FASP projected based aircraft using a top-down linear growth forecasting approach. The state was divided into planning regions, an average growth rate for each was determined, and forecast based aircraft were then calculated for each region given historical trends. Aircraft in each region were then allocated to the individual public use airports within each region based on consideration of the historic market share of the airport. Annual operations for the general aviation airports in the 2004 FASP were projected by creating a ratio of total annual operations to the total number of based aircraft. **Table 4-3** shows the projection of based aircraft and annual operations contained in the 2004 FASP for North County Airport. Overall, the 2004 FASP projects an average annual growth rate of 2.12 percent for based aircraft and 1.5 percent for annual operations.

TABLE 4-3
2004 Florida Aviation System Plan Forecast

Year	Based Aircraft	Total Operations	Operations per Based Aircraft
2005	230	37,661	165
2010	256	40,712	159
2015	284	44,010	155
2020	315	47,575	151
2024	343	50,634	148

Source: FASP 2004

If there is one concern regarding the FASP, it is that it did not consider the inordinately low operations per based aircraft levels that resulted from the approach. As was discussed previously in this report, when F45 is compared to almost any other general aviation airport in the State of Florida, the level of operations on a per-based-aircraft level are inordinately low and there are no discernible reasons or operational characteristics occurring at F45 that would support the contention that this level of operations should be well below the norm for other similar airports. As a result, there is concern that the base numbers upon which the FASP forecasts were based may not accurately reflect the true level of historic operations actually occurring at the Airport. As a result, use of the baseline figures that have been historically estimated in 2004 for F45 (35,532 annual operations) may have skewed the projections of future operations at F45 as contained in the FASP.

4.4 FAA Terminal Area Forecasts

The FAA prepares its TAF annually to meet their internal planning needs of various FAA divisions concerned with staffing to meet the demands associated with future traffic levels at the nation's airports. Except for specific regional or state requests, the airports included in the FAA TAF report must meet at least one of the following criteria:

- Have an existing FAA tower
- Have an existing FAA contract tower
- Be a candidate for a FAA tower
- Currently receive or expected to receive scheduled air carrier or regional/commuter service
- Currently exceed 60,000 itinerant or 100,000 total aircraft operations
- Report 10 or more based aircraft on the latest available FAA 5010 Form

Forecasts in the FAA TAF are calculated using a number of methods, with greater emphasis being placed on commercial passenger airports or larger general aviation reliever airports than on many of the smaller general aviation facilities. Typically, projections are developed using regression analysis with various national economic indicators as independent variables. In the case of F45, the ability to achieve a reliable regression-based forecast was undermined by the wide fluctuations in the estimated historic levels of aircraft operations at F45. **Table 4-4** shows the figures contained in the 2004 TAF for F45.

TABLE 4-4
2004 FAA Terminal Area Forecast

Year	Based Aircraft	Total Operations
2005	215	35,532
2010	216	35,532
2015	217	35,532
2020	218	35,532

Source: FAA TAF 2005

The 2004 FAA TAF projected an average annual growth rate of 0.09 percent for based aircraft. However, the number of annual aircraft operations was held constant over the entire course of the FAA forecast period. According to FAA officials, the zero-growth projection resulted from a lack of valid data for F45. The projection developed by the FAA is a concern for several reasons. First, current policy at the FAA is to use the TAF for more than just FAA workload purposes and to suggest that forecasts developed by airports need to be within 10 percent of the TAF or require detailed justification as to why there is a divergence. A second concern is the low number of additional based aircraft over the 15-year time frame of the TAF. Based on discussions with the airport FBO, over the past year there have been more new based aircraft located at F45 than had been projected for the entire time frame in the TAF. Third, with the basing of additional aircraft, it is reasonable to assume that these new aircraft will add to the total number of operations.

In reviewing projections of based aircraft in the Palm Beach County area it was noted that the FAA had projected growth in based aircraft at both PBI and at LNA. PBI was forecast to see an

additional 27 based aircraft and LNA an additional 111 based aircraft per the projections contained in the 2004 TAF. Both PBI and LNA face constraints that limit the ability of either facility to accommodate the basing of large numbers of based aircraft. Room to accommodate additional based aircraft at PBI is extremely limited and LNA is almost completely built-out with no additional space for ramp or hangar facilities to accommodate new based aircraft. As such, even assuming that all but three of the based aircraft projected by the FAA to locate in Palm Beach County by 2020 will opt to base at PBI or LNA, this option does not appear the be reasonable given the limitations at both airports and the cost structure at PBI. For these reasons, the projections of both operations and based aircraft contained in the TAF for F45 are believed to be in need of adjustment. Discussions regarding these concerns were conducted with the FAA.

SECTION 5

Forecasting Approach

As discussed in prior sections, data from the FAA TAF, FAA Form 5010, or FASP has revealed inconsistencies. Given the significant differences of the data published in these documents and the lack of ATCT records of operational activity or reliable counts as taken from an activity counter, historic airport activity could not be compared to the various economic indices of Palm Beach County. As a result, a linear or multiple regression analysis based on historic activity and their relationship to socioeconomic indicators could not be developed in a way to result in an accurate projection of future activity levels. Similarly, the lack of reliable historic operations data also made the projection of general aviation activity at F45 based on market share analysis impossible. Thus, it was necessary to develop a method to derive an index of possible baseline activity data for F45 that could be used as a foundation for the development of projections of future based aircraft and operations levels at the airport. In light of the concerns regarding the accuracy and reliability of the operations data for F45 the use of a comparative analysis of other general aviation airports was undertaken to define comparable airports and the relationship of based aircraft to the number of annual aircraft operations.

In 2004, operations per based aircraft at F45 totaled 165 annually, assuming that the stated 35,532 annual aircraft operations correctly expressed the actual level of operations. The level of operations per based aircraft should be considered within the context of the fact that there are three flight schools at F45, all of which are actively training students, and F45 receives operational training from other airports that have instituted restrictions on touch-and-go operations, while also experiencing a strong base of itinerant flight activity. Thus, the number of operations per based aircraft is extremely low because there is a strong basis to assume that the estimated annual operations data were significantly understated. This assumption was based on a comparative analysis of 5 years of historic data at eight southeast Florida General Aviation airports. **Table 5-1** presents this information.

TABLE 5-1
Southeast Florida General Aviation Airport Comparison

Year	Total Operations	Total Based Aircraft	Operations per Based Aircraft
Palm Beach County Airpark			
1999	140,325	380	368
2000	143,244	380	377
2001	143,345	380	377
2002	146,413	380	385
2003	149,483	386	387
2004[1]	152,518	392	389

TABLE 5-1
Southeast Florida General Aviation Airport Comparison

Year	Total Operations	Total Based Aircraft	Operations per Based Aircraft
Boca Raton Airport[2]			
1999	132,000	286	465
2000	132,000	286	462
2001	85,554	286	299
2002	89,896	285	315
2003	89,760	287	312
2004*	87,437	292	299
Pompano Beach Airport[2]			
1999	181,454	253	717
2000	184,909	253	731
2001	182,451	253	721
2002	217,051	158	1,374
2003	180,754	157	1,151
2004*	162,934	158	1,031
Fort Lauderdale Executive[2]			
1999	247,228	840	294
2000	260,230	840	310
2001	247,239	708	349
2002	245,155	708	346
2003	228,477	716	319
2004[a]	212,203	727	292
North Perry Airport[2]			
1999	168,260	343	491
2000	200,957	343	586
2001	183,284	325	564
2002	152,097	325	468
2003	134,581	325	414
2004*	140,395	327	429
St. Lucie County[2]			
1999	155,461	147	1,058
2000	170,450	174	980

TABLE 5-1
Southeast Florida General Aviation Airport Comparison

Year	Total Operations	Total Based Aircraft	Operations per Based Aircraft
2001	193,085	170	1,136
2002	193,332	185	1,045
2003	183,716	189	972
2004*	189,049	194	974
Vero Beach[2]			
1999	223,270	246	908
2000	202,596	246	836
2001	221,301	266	832
2002	236,172	256	923
2003	183,732	262	701
2004*	154,774	269	575
Stuart – Witham Field[2]			
1999	115,299	216	534
2000	115,335	216	534
2001	120,121	216	556
2002	124,965	235	532
2003	117,284	242	485
2004*	112,515	250	450

Source: FAA 2005 TAF.
[1] Estimate
[2] Airports with air traffic control tower activity counts.

Based on the data in Table 5-1, it is apparent that other airports in the southeast portion of the state are experiencing activity levels as expressed in terms of operations per based aircraft that significantly exceed the estimated 165 operations per-based-aircraft level estimated at F45. It is interesting to note that the two airports that are most similar to the F45 from an operation per based aircraft perspective are Fort Lauderdale Executive Airport (FXE) and Boca Raton Airport (BCT). Both airports have noise abatement restrictions in place that limit activity. In the case of FXE, Runway 13-31 is closed to flight activity between the hours of 10 p.m. and 7 a.m. and touch-and-go (training) activity can occur only on weekdays and during daytime hours. At BCT, there is a voluntary nighttime curfew on operations, touch-and-go operations are allowed only between 9 a.m. and 5 p.m. Monday through Fridays, and stop-and-go training operations are prohibited. Despite the operational limitations at both facilities, FXE and BCT each record approximately 130 more annual operations per based aircraft than the estimated level at F45. The accuracy of the aircraft operational data is better than that from F45 because all of the airports listed above, with the exception of Palm Beach County Airpark, have air traffic control

facilities that record operations. A review of the 2004 data in Table 5-1 results in an average of 555 operations per based aircraft for the eight southeast Florida airports.

While there is an obvious difference between F45 and southeast Florida airports, it was decided to check whether other general aviation facilities in other portions of the state were experiencing a level of operations per based aircraft as low as that at F45 or if they, too, were more consistent with what was occurring at the eight previously discussed southeast Florida airports. **Table 5-2** provides a sampling of information on based aircraft and operations per based aircraft for year end 2004 for airports outside of the Southeast Florida area.

TABLE 5-2
2004 Operations Per Based Aircraft – Examples

Airport	Operations Per Based Aircraft	Airport	Operations Per Based Aircraft
Page Field[1]	357	Orlando Executive[1]	292
Venice Airport	751	Ormond Beach Airport	751
Plant City Airport	676	Charlotte County Airport[2]	234
Vandenburg Airport	556	Craig Airport	572
Peter O Knight	426	Sebastian Municipal	716
Space Coast Regional[1]	823	Albert Whitted Airport	512
Leesburg Municipal	544	Ocala International Airport[3]	378
Zephyrhills Municipal	418	Kissimmee Municipal[1]	768
Winter Haven	412	Bartow Municipal Airport	371

Source: FDOT Continuing Aviation System Plan (CASP).
[1] Airports having air traffic control tower operational counts.
[2] Charlotte County Airport experienced a direct hit by Category 4 Hurricane Charley in August 2004.
[3] Ocala International Airport is a General Aviation Airport.

Statewide Florida General Aviation Airports averaged 651 operations per based aircraft in 2004, which needs to be considered in light of the fact that in 2004 (starting on August 13 through the latter part of September) the state was hit by two Category 3 hurricanes and two Category 4 hurricanes that impacted a number of the state's airports both during the storms and for some time after the storm events. General aviation airports including Charlotte County, Sebastian Municipal, Port St. Lucie International, Stuart-Witham Field, Vero Beach, Orlando Executive, Winter Haven, and Kissimmee Municipal all experienced damage, including loss of aircraft from these storms.

The review of other airports and their comparative levels of operations per based aircraft fully support the contention that estimates of operations at F45 over the last several years have understated actual operations levels, and, potentially, significantly understated these levels. As a result, the first step in the forecast process was to obtain a consensus with the FAA about the need to adjust the baseline number. The FAA Forecast Branch in the agency's Washington, D.C. headquarters was contacted and the comparative airport analysis was provided to the appropriate representatives of the agency. A subsequent teleconference was conducted and both the basis and extent of baseline adjustment were reviewed.

A selected set of seven general aviation airports located in both southeast Florida and outside the area that share characteristics with F45 were identified and their operations per based aircraft along with the estimated level at F45 were averaged. This resulted in F45 operations per based aircraft being conservatively estimated to be in the range of 300 to 350 operations per based aircraft annually. Given this range, a level of 325 operations per based aircraft was selected to represent the baseline operations level per aircraft for F45 for purposes of estimating an adjusted baseline annual operations level at the airport. Applying the 325 operations per based aircraft to the 2004 number of based aircraft results in an estimate of 69,875 aircraft operations for base year 2004.

SECTION 6

Forecast of Based Aircraft

The number of based aircraft provides a basic indicator of general aviation demand at an airport. By first developing a forecast of based aircraft, the growth of other factors can be projected. The 2004 Base Year number of based aircraft of 215 was taken from the FAA Airport Record 5010 and verified through discussions with the Fixed Base Operator located at F45.

In projecting based aircraft at F45, local and national growth trends were considered, along with the role that competing airports and ongoing development may play in the decision of aircraft owners to base at a particular airport. The FAA, in its annual Aerospace Forecasts, projects the total U.S. Active General Aviation Aircraft fleet to grow at an average annual rate of 0.81 percent from 2004 to 2016. However, when the FAA began the process of projecting growth of based aircraft at specific airports in Palm Beach County as a part of the annual TAF projections, the agency projected practically no growth (0.08 percent) of based aircraft at F45 during the same period. Based on the 2004 TAF, the airport would experience only three additional based aircraft by 2016. This was not the case for other airports in Palm Beach County, however. The TAF projected that LNA would see an additional 111 based aircraft despite the fact that it would be difficult for the airport to find room for these additional aircraft, and PBI would need to accommodate an additional 27 based aircraft in spite of the constraints affecting general aviation at the airport and somewhat higher costs associated with PBI operations.

After reviewing facilities at both LNA and PBI, it was determined that a combination of factors, including existing site constraints and cost considerations, would make it highly improbable that these airports could support the full number of based aircraft forecast in the TAF. Furthermore, the increase in based aircraft for the year 2016 contained in the 2004 TAF was fulfilled in 2005, based on discussions with the airport FBO. Finally, given the facts that major roadway improvements are under way in the vicinity of F45, that F45 is located only 26 miles from LNA and 21 miles from PBI, and that it is accessible via state and federal highways, the projection of only three additional based aircraft is considered unrealistic. On the contrary, it appears that the TAF projections were developed without the benefit of a full understanding of the viability of the airport, the proximity of the airport, and the ongoing changes in the local area.

Therefore, the projection of based aircraft in the TAF was amended after considering PBI's higher costs and space limitations, and LNA's lack of space and facilities for added growth. The assumptions guiding the development of based aircraft forecasts for F45 were that: (1) approximately half of the projected growth in based aircraft at LNA would shift to F45 given the lack of space for additional ramp area and hangar development and that these aircraft would consist of single- and twin-engine piston and a limited number of turbo-prop aircraft; and, (2) overall based aircraft would not increase at PBI, but rather there would be a transition in the sophistication of the fleet with piston aircraft, turbo-prop and light jets tending to opt to base more and more at F45, while heavy business jets backfilled at PBI. **Table 6-1** shows the forecast of based aircraft for F45.

TABLE 6-1
Based Aircraft Forecast

Year	Total Based Aircraft
Base Year	
2004	215
Forecast	
2005	218
2010	239
2015	266
2020	296
2025	329

Source: Ricondo & Associates.

With the establishment of the overall number of based aircraft, it is necessary to define the aircraft fleet mix expected to use the airport in order to properly plan facilities that will best serve the level of activity and the type of activities occurring at the airport. **Table 6-2** shows the 2004 based aircraft fleet mix as being composed mainly of single-engine piston aircraft, as would be expected at an airport with the facilities of F45. What is surprising is the level of based business jets at the airport, which is indicative of the shift of smaller business jets away from the constraints and costs of PBI, alluded to earlier.

TABLE 6-2
Fleet Mix Forecast

Year	Single Engine	Multi-Engine	Turbo-Prop	Jet	Rotor	Other	Total
Base Year							
2004	128	47	20	7	5	8	215
Forecast							
2005	130	47	20	8	5	8	218
2010	146	48	21	11	6	7	239
2015	166	50	22	14	8	6	266
2020	188	51	23	19	10	5	296
2025	213	52	24	24	11	5	329

Source: Ricondo & Associates.

Table 6-2 also shows the projected fleet mix for F45. As displayed in the table, the most significant component of activity at the airport will remain in the single-engine piston category. In large part, this results from the redistribution of based aircraft between the three primary airports serving Palm Beach County, as discussed previously. The major growth areas for based aircraft at F45 are in the single-engine and jet aircraft categories. As noted, this growth is

primarily from the redistribution of aircraft among PBI, LNA, and F45. The growth of based jets at F45 will be enhanced by programmed major roadway improvements that will significantly enhance the accessibility of F45. Growth in the immediate area of F45, including the high-technology development associated with the Scripps Institute and its spin-off activities, will continue to facilitate the shift that is currently occurring of light jets out of PBI to F45, along with the potential growth that will occur from the introduction of the VLJ category of jets. Based jets at F45 are anticipated to consist of aircraft generally of 30,000 pounds or less (VLJs and light to moderate-sized business jets), consistent with current patterns. Growth in multi-engine piston and turbo-prop based aircraft will be limited given the introduction of the VLJs and splitting this activity between F45 and, primarily, LNA.

SECTION 7

Forecast of Operations

The assumption guiding the adjustments to the baseline operations data were discussed in Section 6 of this report. Using the adjusted baseline data, a projection of future general aviation operations at F45 was developed. General aviation operations are divided into the categories of local or itinerant. The FAA defines an operation as either a single aircraft landing or takeoff. 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 area covers a 20-nautical-mile radius of the airfield. Local operations are most often associated with training activity and flight instruction. Touch-and-go training procedures are considered local operations. A touch-and-go is a training operation in which a landing approach is made, the aircraft touches-down on the runway and, full engine power is applied while still rolling and a takeoff is made, thereby practicing both maneuvers, takeoff and landing, as part of one motion. A touch-and-go counts as two separate aircraft operations, a landing and a takeoff. Itinerant operations include arrivals or departures other than local operations, performed by either based or transient aircraft that do not remain in the airport traffic pattern.

At F45, flight training accounts for approximately 32 percent of all aircraft operations based on the estimates provided by the airport FBO and reflected in the FAA TAF projections. This activity is associated with the activities of the three flight schools at F45, operations conducted by locally based aircraft owners maintaining their piloting skills, and also reflects some activity that comes to F45 to conduct touch-and-go operations from other airports with training restrictions. Itinerant general aviation operations are typically composed of private for-pleasure flying, business/corporate flight operations, and operations that may include law enforcement and medical flights.

Growth in the level of operational activity was projected at F45. This increase in activity was projected to average an annual growth rate of 2.28 percent for total operations. This growth would occur as a result of basing additional aircraft at F45, as well as being associated with a small increase from 325 to 337 operations per based aircraft over the forecast period.

Table 7-1 displays the projection of total aircraft operations as well as the split of local operations versus itinerant operations over the course of the 20-year forecast period. The local and itinerant split of operations for the base year was assumed to remain constant at 32 percent through the forecast period.

TABLE 7-1
Forecast of Operations

Year	Local Operations	Itinerant Operations	Total Operations	Annual Percent Change	Operations per Based Aircraft	Annual Percent Change
Base Year						
2004	22,360	47,515	69,875	-	325	-
Forecast						
2005	22,672	48,178	70,850	2.28%	325	0.0%
2010	25,094	53,325	78,419	2.28%	328	0.18%
2015	28,162	59,845	88,007	2.28%	331	0.18%
2020	31,606	67,162	98,768	2.28%	334	0.18%
2025	35,470	75,374	110,844	2.28%	337	0.18%

Source: Ricondo & Associates

SECTION 8

Peak Activity Forecasts

Airport traffic displays peaking characteristics by month of year, day of week, and hour of the day. Because there is no base of accurate historic traffic data available, it was assumed that operational traffic levels at F45 are fairly well spread out throughout the year. At most airports, the busiest month usually averages between 9 and 12 percent of the annual operations. For the purpose of this study, an average of 10 percent was assumed. This percentage was applied to the forecast annual operations through the year 2025 to provide an estimate of peak month operations over the forecast period.

The average daily operations during the peak month were derived by taking the number of operations calculated for the peak month and dividing that figure by 30 days. As such, average daily operations were derived by taking 10 percent of forecast operations, then dividing by 30. The peak-hour operations at F45 are estimated to be 10 percent of the peak month, average day. **Table 8-1** delineates this change, as well as the peak operations calculated for the planning period.

TABLE 8-1
Peak Operations Forecasts

	Base Year	Forecast				
	2004	**2005**	**2010**	**2015**	**2020**	**2025**
Total Annual	69,875	70,850	78,419	88,007	98,768	110,844
Peak Month	6,987	7,085	7,841	8,800	9,876	11,084
Peak Month Average Day	233	236	261	293	329	369
Peak Hour	23	24	26	29	33	37

Source: Ricondo & Associates

SECTION 9

Summary of Forecasts

Table 9-1 presents a summary of the forecasts, which have been presented in this chapter, including based aircraft and annual operations. It should be noted that an individual forecast was not developed for military operations because their levels are expected to be negligible. This, coupled with the fact that there are no regularly scheduled flights of any kind at F45, led to the categorization of all flights (including air taxi operations) into either local or itinerant general aviation.

TABLE 9-1
Summary of Aviation Demand Forecasts

	Base Year	Forecast				
Category	**2004**	**2005**	**2010**	**2015**	**2020**	**2025**
Based Aircraft						
Single Engine	128	130	146	166	188	213
Multi-Engine	47	47	48	50	51	52
Turbo-Prop	20	20	21	22	23	24
Jet	7	8	11	14	19	24
Rotor	5	5	6	8	10	11
Other	8	8	7	6	5	5
Total	215	218	239	266	296	329
Operations						
Local	22,360	22,372	25,094	28,162	31,606	35,470
Itinerant	47,515	48,178	53,325	59,845	67,162	75,374
Total	69,875	70,850	78,419	88,007	98,768	110,844
Peak Operations						
Peak Month	6,987	7,085	7,841	8,800	9,876	11,084
Average Day	233	236	261	293	329	369
Peak Hour	23	24	26	29	33	37

Source: Ricondo & Associates.

In summary, the data and methods used to forecast aviation demand for the Airport have been discussed with, and accepted in concept by, the FAA as being consistent with patterns of activity experienced at a diverse variety of general aviation airports throughout the state of Florida. The role of the airport within the community and its activity level remains subject to a variety of factors. The Palm Beach County Department of Airports is expected to remain proactive in maintaining existing facilities, marketing the airport, and expanding facilities, as

feasible, throughout the planning period. The establishment of TSRI in Palm Beach County was the result of many efforts that required the support of many agencies and people. The influence that this development will have on activity levels at F45 and elsewhere will need to be monitored and the influence that the new roles and opportunities for general aviation use as a result of TSRI will need to be reviewed. The forecasts presented in this section are considered to be conservative but realistic estimations of current and future activity that can be expected at F45. While there are potential issues that could adversely affect general aviation (such as high fuel prices), there are other positive influences that can act to counter-balance such concerns. Overall, activity at F45 is expected to show steady growth throughout the forecast period.

Technical Report #3

North Palm Beach County General Aviation Airport Demand/Capacity and Facility Requirements

North Palm Beach County General Aviation Airport

Prepared for

Palm Beach County Department of Airports

OCTOBER 2006

CH2MHILL
In Association with Ricondo & Associates, Inc.

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SECTION 1

Airfield Demand Capacity and Facility Requirements

This chapter describes the available and needed capacity as well as the facilities required to accommodate aviation demand at North Palm Beach County General Aviation (F45) Airport over the 20-year planning period. Facility requirements were developed by taking the aviation forecasts and performing demand/capacity analysis on the various functional areas.

The facility requirements were developed at a level of detail appropriate for an airport master plan, not the level of detail suitable for an architectural or engineering design study. Required or recommended facility improvements are identified and quantified, and in the next chapter specific alternative methods of meeting these needs will be identified and evaluated.

1.1 Airfield Capacity

Information contained in this section, Airfield Capacity, is provided from the 2005 *North County Airport Development Plan Working Paper*.[1] This document is provided in full, in **Appendix B**. The purpose of this analysis is to determine the capability of F45 to meet the forecast demand over the planning period. The calculated capacity will be compared to the forecast demand from the F45 Aviation Activity Forecast[2] to determine if the airfield configuration will adequately meet those demands without creating unacceptable delays for airport users.

1.1.1 Existing and Forecast Demand

Airport facility planning must begin with a definition of the projected aviation demand that may reasonably be expected to occur at the airport over a specific future period. For F45, this involves the development of a 20-year forecast of aviation activity that includes 2005, 2010, 2015, 2020 and 2025. Forecasts of based aircraft, the based aircraft fleet mix, and annual aircraft operations, along with consideration of aviation activity peaking characteristics, serve as the basis for airport facility planning.

1.1.1.1 Forecast Summary

Table 1-1 presents a summary of the Aviation Activity Forecast including based aircraft and annual operations. It should be noted that a forecast was not developed for military operations because their levels are expected to be minimal. This, coupled with the fact that

[1] CH2M HILL and Ricondo & Associates, Inc., North County Airport Development Plan Working Paper, October 2005.

[2] CH2M HILL and Ricondo & Associates, Inc., North County General Aviation Airport Aviation Activity Forecast, October 2005, approved by the FAA in February 2006.

there are no regularly scheduled flights of any kind at F45, led to the categorization of all flights (including air taxi operations) into either local or itinerant general aviation (GA).

TABLE 1-1
Summary of Aviation Demand Forecasts

	Base Year	Forecast				
Category	**2004**	**2005**	**2010**	**2015**	**2020**	**2025**
Based Aircraft						
Single Engine	128	130	146	166	188	213
Multi-Engine	47	47	48	50	51	52
Turbo-Prop	20	20	21	22	23	24
Jet	7	8	11	14	19	24
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Total	215	218	239	266	296	329
Operations						
Local	22,360	22,372	25,094	28,162	31,606	35,470
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Total	69,875	70,850	78,419	88,007	98,768	110,844
Peak Operations						
Peak Month	6,987	7,085	7,841	8,800	9,876	11,084
Average Day	233	236	261	293	329	369
Peak Hour	23	24	26	29	33	37

Source: Ricondo & Associates, Inc.

In summary, the data and methods used to forecast aviation demand for the Airport have been discussed with, and accepted in concept by, the Federal Aviation Administration (FAA) in February 2006, as being consistent with patterns of activity experienced at a diverse variety of GA airports throughout the state of Florida. The role of the airport within the community and its activity level remains subject to a variety of factors. The Palm Beach County Department of Airports (PBC DOA) is expected to remain proactive in maintaining existing facilities, marketing the airport, and expanding facilities, as feasible, throughout the planning period. The forecasts presented in this section are considered to be conservative but realistic estimations of current and future activity that can be expected at F45. While there are potential issues that could adversely affect GA (such as high fuel prices), there are other positive influences that can act to counter-balance such concerns. Overall, activity at F45 is expected to show steady growth throughout the forecast period.

1.1.1.2 Aircraft Mix Index

The operational aircraft fleet at an airport influences an airfield's capacity based on differing aircraft spacing requirements, both vertically and horizontally. The in-flight aircraft spacing requirements that have been established by the FAA are intended to enhance the safety of aircraft operations. On approaches and departures, one of the more significant concerns is associated with the wake turbulence forces, or vortices, that trail behind a plane. The vortex originates at the aircraft wingtip and can best be visualized as horizontal tornados coming off of the wings. If there is not enough time allowed between aircraft operations for the vortices to dissipate before a second aircraft lands or departs, the second aircraft can become unstable. This becomes more critical as small GA and larger models of business jets operate on the same runway.

Another way the aircraft fleet influences the airfield's capacity is the time needed for the aircraft to clear the runway, either upon arrival or departure. As aircraft size and weight increases, so does the time needed for it to slow to a safe taxiing speed or to achieve the needed speed for takeoff. Therefore, a larger aircraft generally requires more runway occupancy time than a smaller aircraft. This issue is more applicable to commercial service airports having a significant amount of GA activity rather than having a significant adverse influence at an airport such as F45, where even jet operations are by smaller aircraft models.

FAA Advisory Circular (AC) 150/5060-5 defines four classes of aircraft used for capacity determinations. Therefore, the operational fleet at an airport is determined by the relative percentage of operations conducted by each of the four classes of aircraft. As identified in **Table 1-2**, this classification is based on the maximum certificated takeoff weight of the aircraft, the number of engines, and the wake turbulence classifications.

TABLE 1-2
Aircraft Classifications for Airport Capacity Determination

Aircraft Class	Maximum Certified Takeoff Weight (lbs)	Number of Engines	Wake Turbulence Classification
A	12,500 or less	Single	Small (S)
B	12,500 or less	Multi	Small (S)
C	12,500 to 300,000	Multi	Large (L)
D	More than 300,000	Multi	Heavy (H)

Source: FAA Advisory Circular (AC) 150/5060-5, Change 2, Airport Capacity and Delay.
Prepared by Ricondo & Associates, Inc.

This aircraft classification is used to calculate the aircraft mix index, which is a mathematical expression used as one of the inputs to calculate airfield capacity. The formula for determining the mix index is the percentage of category C aircraft plus three times the percentage of category D aircraft [%(C + 3D)]. The percentage of category A and B aircraft is not considered because the wake turbulence generated by these small aircraft dissipates fairly rapidly, allowing other aircraft to be spaced closer than to a category C or D aircraft. At F45, the current aircraft mix includes primarily class A and B aircraft, with occasional operations by aircraft over 12,500 pounds (Class C). Because no category D aircraft operate

into and out of the Airport, nor are they forecast to do so over the planning period, the mix index for the Airport is equivalent to the percent of annual operations by category C aircraft.

Currently, not enough category C aircraft operate at the Airport to be considered significant; however, for planning purposes, it is reasonable to assume that by 2025, 10 percent of the future jet aircraft in the operational fleet mix will be category C aircraft. This assumption is derived from the fact that more than 40 percent of the jet aircraft that currently operate at Palm Beach International Airport (PBI) fall within category C and it is assumed that some of these aircraft will relocate to F45.[3]

Using the FAA formula, the aircraft mix index will simply increase to 10 percent by the year 2025 from the Airport's current index of zero. As the aircraft mix index rises, the capacity of the airfield to accommodate aircraft operations decreases, albeit the extent of the decrease is often limited. Given the low level of category C aircraft at F45, the decrease in the overall capacity at the Airport will be insignificant.

1.1.1.3 Aircraft Classification Table

Airfield facilities needed at F45 to accommodate the projected level of aviation demand were determined using applicable FAA standards and requirements. The FAA has established a set of airport classifications known as the airport reference code (ARC) that are applicable to each airport and its individual runway and taxiway components. As noted in the previous section, the primary determinants of these classifications are the operational and physical characteristics of the most demanding types of aircraft intended to use the runway and taxiway system and the instrument approach minimums applicable to a particular runway end. Typically, an aircraft or type of aircraft must have 500 or more annual operations (equivalent to 250 departures and 250 landings) to be considered a critical aircraft. Each ARC consists of two components relating to aircraft design and performance. The first component, depicted by a letter, is the aircraft approach category, as determined by the approach speed of the critical aircraft. The second component, depicted by a Roman numeral, is the Airplane Design Group (ADG), as determined by the critical aircraft's wingspan. Generally, aircraft approach speed applies to runways and runway-related facilities. Airplane wingspan relates primarily to separation criteria between runways, taxiways, parking areas, and taxilanes. **Table 1-3** summarizes the FAA aircraft classification as listed in AC 150/5300-13, Change 10.

Aircraft approach categories A and B typically include small single- and twin-engine piston aircraft, a significant percentage of the turbo-prop fleet and, in the case of approach category B, a limited number of smaller business jets having approach speeds of 121 knots or less. Categories C and D consist of approximately one-half of the business jet fleet, larger commercial jets, and propeller aircraft generally associated with commercial and/or military use. Approach category E is almost exclusively composed of military jet aircraft. In the case of F45, only aircraft in approach categories A, B, and C are anticipated to operate at the Airport and the approach category C aircraft would be made up of small to mid-sized business jets.

[3] Source: PBI Operations Report- 3/14/05- 3/20/05- All Operations except Commercial.

TABLE 1-3
FAA Aircraft Classifications

Aircraft Approach Category		Airplane Design Groups	
Category	Approach Speed (knots)	Design Group	Wingspan (ft)
A	< 91	I	< 49
B	91 but < 121	II	49 but < 79
C	121 but <141	III	79 but < 118
D	141 but < 166	IV	118 but < 171
E	> 166	V	171 but < 214
		VI	241 but < 262

Source: FAA AC 150/5300-13, Change 10, Airport Design.
Prepared by Ricondo & Associates, Inc., September 2005.

ADG I and II primarily include small single- and twin-engine piston aircraft, light and midsize business jets, and a variety of single- and twin-engine turboprop aircraft. ADG III includes only a limited number of large business jet models that have entered the fleet over the last 5 to 7 years, including the Canadair Global Express and the Gulfstream V, and is composed primarily of a large percentage of the commercial jet aircraft fleet.

According to the most recent FAA approved Airport Layout Drawing, dated November 2003, the current ARC for F45 is identified as a B-II classification, which is intended to accommodate aircraft having approach speeds of less than 121 knots (Approach Category B), and wingspans of less than 79 feet (Design Group II). Currently, there are components of the business jet fleet that occasionally operate at the Airport that are classified in approach Category C, although the level of operations by these aircraft does not exceed the threshold for designating these users as the design aircraft (500 operations annually).

While most of the aircraft operating at the Airport are small, single-engine piston aircraft weighing less than 12,500 pounds, there are larger based and transient aircraft that perform frequent operations at the Airport. In 2004, for example, there were 20 turboprop and 7 jet aircraft based at the Airport. While the types of these based aircraft are not specified in airport records, it is likely that most of the jets and, potentially, some of the turboprop models exceed 12,500 pounds. For example, with the exception of a small number of very light jets (VLJs), such as the Cessna Citation I and CJ1, which weigh 11,850 and 10,600 pounds, respectively, the U.S. jet fleet mix includes a majority of aircraft exceeding 12,500 pounds.

In addition, as noted in the Aviation Activity Forecasts, the growth of based jets at F45 will be enhanced by the programmed major roadway improvements that will significantly enhance the accessibility of F45. Increased commercial aircraft traffic at PBI, along with the constrained available area for expanded GA development and the higher cost structure at PBI, will facilitate the shift of light, and even some mid-sized jets out of PBI to F45.

To determine the adequacy of the current runway lengths at F45 to meet the forecast of demand, it was considered prudent to review the types of jets currently operating at PBI that would be likely candidates to shift their operations to F45 in the future. Among these aircraft, the Raytheon Beechjet 400 and 400A, the Bombardier Learjet 35, 45, and 60, the Cessna Citation II, V, VI, and VII, the Dassault Falcon 10 and 20, and the Raytheon Hawker 700 and 800 series are typical of light and midsize jet aircraft regularly operating at PBI and likely to fly into and out of F45 in the future.

All but one of these aircraft fall within approach categories B and C, and all are within Design Group I and II. In the future, turbojet aircraft, such as the Cessna Citation VI and Dassault Falcon 20 represent the aircraft with the largest wingspans expected to regularly use the Airport. These aircraft, which have wingspans of less than 55 feet, are included under Design Group II aircraft standards. The Learjets, the Cessna Citation VI, and the Raytheon Hawker 700 and 800XP represent the aircraft with the fastest approach speeds. These aircraft fall within Approach category C, with the exception of the Learjet 35A, which has an approach speed of 143 knots, putting it just inside category D. Because the aircraft listed in **Table 1-4** are considered to best represent the grouping of more demanding aircraft anticipated at the Airport, and the design requirements are essentially the same for approach categories C and D, an ARC of C-II would fully accommodate future aircraft traffic.

It would be ideal for the three runways at F45 to comply with the design standards associated with an ARC of C-II, but this would result in unnecessary improvement and maintenance costs and is unjustified by the traffic demand. Such improvements would require clearing and grading of larger ROFAs and RSAs, expanded clearing of potentially environmentally sensitive lands to meet RPZ requirements associated with each of the runway ends, and the relocation of Taxiways C and D. The Airport capacity considerably exceeds the projected traffic demand. In light of the projected traffic demand and apart from other considerations, such as aircraft traffic segregation or crosswind coverage, a single runway could accommodate projected traffic for years to come. Thus, only one of the runways at F45 should be upgraded to C-II design standards, while the other runways should remain at B-II standards.

1.1.2 Meteorological Conditions

Meteorological conditions have a direct impact on the operational characteristics of the Airport. The conditions determine the direction in which aircraft operate, the frequency of use of each operating configuration, and the instrumentation required in assisting pilots in landing and departing.

1.1.2.1 Ceiling and Visibility Conditions

Airfield and airspace capacity is impacted by the flight rules that aircraft operate under, which is governed by the ceiling and visibility conditions at the airport, due to differing spacing requirements.

TABLE 1-4
Representative Jets Expected at F45

Aircraft Model	Est. Percent Jet Operations at PBI	Approach Category	Maximum Takeoff Weight (in lbs)	Wingspan and Design Group
Bombardier Learjet 35A	4.8%	D	18,300	39'6" – I
Bombardier Learjet 45	1.6%	C	19,500	47'1" – I
Bombardier Learjet 60	4.6%	C	23,500	43'9" – I
Cessna Citation II	3.0%	B	15,900	52'2" – II
Cessna Citation V	7.6%	B	15,900	52'2" – II
Cessna Citation VI/VII	3.6%	C	22,450	53'6" – II
Dassault Falcon 10	5.3%	B	18,740	42.9' – I
Dassault Falcon 20	5.3%	B	28,660	53.5' – II
Raytheon Beechjet 400	3.8%	B	16,100	43'6" – I
Raytheon Hawker 700	4.9%	C	25,500	47.0' – I
Raytheon Hawker 800XP	4.9%	C	28,000	51'5" – II

Source: PBI Operations Report—3/14/05-3/20/05; FAA AC 150/5300-13, Change 10, *Burns & McDonnell's Aircraft Characteristics (8th Edition)*.
Prepared by Ricondo & Associates, Inc., September 2005.

Aircraft operate under two distinct categories of operational flight rules: visual flight rules (VFR) and instrument flight rules (IFR), which directly impact air traffic control procedures. These flight rules are closely related to the two categories of weather conditions: VMC (fair to good weather), and IMC (poor weather conditions with typically poor visibility). VMC is defined as conditions in which the ceiling is at or above 1,000 feet above ground level (AGL) and the visibility is at or above three statute miles. IMC exists whenever the ceiling drops below 1,000 feet AGL and/or the visibility is below three statue miles. In the West Palm Beach area, VMC occurs approximately 99 percent of the time, and IMC occurs approximately one percent of the time.

Aircraft may operate under VFR during VMC. In these conditions, the pilot is primarily responsible for seeing other aircraft and maintaining safe separation; navigation is typically performed by reference to geographic and other visual references. As a result, aircraft separation requirements are reduced, increasing airspace and airfield capacity as compared to IFR.

During IMC, aircraft operate under IFR. Air Traffic Control (ATC) is primarily responsible for aircraft separation and exercises positive control over aircraft during these conditions. In order to operate under IFR conditions, pilots must be certified instrument rated and meet proficiency requirements, and aircraft must meet certain minimum equipment requirements. Navigation is typically performed by the use of radio navigational aids and vectors from ATC, in addition to the use of ATC-assigned routes and altitudes. As a result of the more stringent requirements due to limited visibility between aircraft, separation is increased during IMC which therefore reduces airspace and airfield capacity.

1.1.2.2 Runway Wind Coverage

Aircraft arrival and departure runways are determined by wind direction, as aircraft generally takeoff and land into the wind. Due to limitations by aircraft type with regard to maximum allowable crosswind[4] for takeoff and landing, strong crosswinds may result in pilots having to divert to another airport if there is not a crosswind runway available.

In order to quantify crosswind, pilots and airport planners calculate crosswind components based on wind direction and speed. Each aircraft type is certified to operate within a maximum crosswind component; larger, heavier aircraft are more resistant to wind and are generally able to operate with higher crosswinds, while smaller, lighter aircraft are more subject to wind and are therefore more restricted.

The FAA recommends that airports provide at least 95 percent wind coverage for planning purposes under the limitations as defined below. If a single runway does not provide at least 95 percent wind coverage for the ARC, a crosswind runway should be considered. The current ARC for F45 is B-II, which allows for a 13-knot maximum crosswind component.

The main runway (Runway 8R/26L) provides more than the 95 percent coverage recommended by FAA for the 13-knot crosswind component under VMC. During IMC, the main runway provides less than the recommended 95 percent wind coverage; however, for all-weather combined, the wind coverage is again greater than 95 percent. Additionally, when considered together, the combined two runway system provides greater than 95 percent coverage for all weather categories, for all applicable crosswind components.

1.1.3 Runway Configuration

The layout of the airfield refers to the arrangement and interaction of the airfield components, which include the runway system, taxiways, and ramp entrances. F45 is composed of a three-runway system. Two of the runways, Runways 8L/26R and 8R/26L, are parallel to one another and are oriented in a general east-west direction. The two runways have a centerline-to-centerline separation distance of 2,500 feet. Runway 8R/26L is 4,300 feet long and 100 feet wide, constructed of asphalt pavement, and equipped with high intensity runway lights (HIRL). Because of its precision approach capability it is generally considered the primary runway at F45. Runway 8L/26R is a turf runway devoted to small aircraft operations and is 3,700 feet long and 75 feet wide. Because of the northwest-southeast alignment of the Bee Line Highway (State Road 710), the turf runway is sited with a westward stagger, when compared to the alignment of Runway 8L/26R.

The third runway, designated as Runway 13/31, is oriented in a northeast-southwest direction and is 4,300 feet long and 75 feet wide. Runway 13/31 is equipped with Medium Intensity Runway Lights (MIRL), is constructed of asphalt, and has a pavement strength rating of 30,000 pounds single-wheel loading. This runway is also equipped with Runway End Identifier Lights (REIL); however, these lights are not currently operational.

[4] Crosswind is the velocity of wind at a right angle to the runway, calculated from the wind speed and heading in relation to the runway.

1.1.4 Runway Pavement Strength

Information provided by the Palm Beach County DOA, as well as delineated on the latest approved Airport Layout Drawing, indicates that Runway 8R/26L has a published rating of 12,500 pounds, while the pavement strength for Runway 13/31 has a published gross-weight-bearing capacity of 30,000 pounds allowing this runway to be used by small corporate jet aircraft. The maximum takeoff weight of the small to mid-sized business jet aircraft that are anticipated to regularly use the Airport is expected to exceed the actual gross-weight-bearing capacity for both Runways 8R/26L and 13/31. Because a large majority of light and midsize business jets have maximum takeoff weights that range between 12,500 and 40,000 pounds, potentially some strengthening of existing runway pavements may be necessary to allow these aircraft to use Runway 8R for their instrument landings, as well as to allow Runway 13/31 to be capable of accommodating an aircraft slightly exceeding the current 30,000 pound strength. The DOA should monitor fleet activity and destinations served over the course of the planning period to determine if, and when, such strengthening of Runway 13/31 should be undertaken.

1.1.5 Taxiway Configuration

The distance an aircraft has to travel to an exit taxiway after landing also sets limits on airfield capacity because the longer an aircraft is on the active runway, the longer that runway is unavailable for another aircraft operation. If taxiways are placed at the approximate location where the aircraft would reach safe taxiing speed, the aircraft can exit and clear the runway for another user. However, if the taxiway is spaced either too close or too far from the touchdown zone, the aircraft will likely spend more time on the runway than if the taxiway had been in the optimum zone. Although pilot technique also contributes, the FAA has determined optimal distances to exit taxiways based on the mix index. The optimum taxiway exit distance is shown in **Table 1-5**.

TABLE 1-5
Optimum Taxiway Exit Distance

Mix Index	Minimum Distance from Threshold (ft)	Maximum Distance from Threshold (ft)
0 to 20	2,000	4,000
21 to 50	3,000	5,500
51 to 80	3,500	6,500
81 to 120	5,000	7,000
121 to 180	5,500	7,000

Source: FAA AC 1505060-5, Change 2, Airport Capacity and Delay.
Prepared by Ricondo & Associates, Inc.

Several taxiway connectors/exits serve the three runways at F45. There are eight taxiway exits that connect Runway 8R/26L (assuming Runway 13/31 is not used as a runway exit) to Taxiway K on its north side. Runway 13/31 is served by seven exits located east of the runway alignment nearest existing airport facilities, and, finally, Runway 8L/26R features 12 exits that are uniformly positioned on both sides of the turf runway alignment. Based on FAA criteria, the exit factor at F45 is maximized when the runways have exit taxiways

between 2,000 and 4,000 feet from the runway ends. Using this criterion, Runway 8R has three exits, Runway 26L two exits, Runway 13 three exits, Runway 31 two exits, Runway 8L three exits, and Runway 26R three exits within the optimum range. Thus, the exit factors for each of the runways at F45 are positioned to maximize operational efficiency.

1.2 Airfield Capacity Analysis

This section compares the forecast of annual aircraft operations to airfield capacity. Although airfield capacity is not expected to be an issue within the planning period, airfield improvements may be required for F45 to improve its operational capacity.

1.2.1 Hourly Runway Capacity

Hourly capacity of the runways 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 used 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, touch-and-go factor, and exit factor. This equation is:

Hourly Capacity = C* x T x E

In this equation C* refers to the hourly capacity base, T is the touch-and-go factor, and E corresponds to the exit factor.

The hourly capacity base (C*) is determined from the appropriate graph based on the aircraft mix index and the percent of aircraft arrivals expected during the peak hour. The touch-and-go factor (T) is determined from the percent of touch-and-go operations and the aircraft mix index. For IFR calculations, T is always one because these training operations are generally not conducted, or do not occur, to a degree to affect operational activity during IFR conditions. In similar fashion, the exit factor (E) is determined from a table based on the aircraft mix index, percent of aircraft arrivals, and the number of taxiways within the specified exit range.

An airport's mix index can substantially change the value of the hourly capacity base in the FAA capacity tables. However, at F45 the mix index varies only slightly over the course of the planning period. For IFR calculations, the hourly capacity remains constant throughout the planning period. **Table 1-6** summarizes these hourly capacity values that and were used to calculate the annual service volume.

TABLE 1-6
Based Hourly Capacities

Year	Mix Index	VFR Hourly Capacity	IFR Hourly Capacity
Base Year			
2004	0.0%	126	63
Forecast			
2010	2.5%	112	62
2015	5.0%	106	61
2020	7.5%	101	60
2025	10.0%	94	60

Source: Ricondo & Associates, Inc., September 2005.
Prepared by Ricondo & Associates, Inc.

1.2.2 Annual Service Volume

The second indicator of airfield capacity that must be computed is the ASV, which represents a measure of the approximate number of total operations that the airport can support annually. In other words, the ASV represents the theoretical limit of operations that the airport can safely accommodate without incurring exponentially increasing levels of delay to operations. Using the FAA's methodology to estimate ASV, first the ratio of annual demand to average daily demand during the peak month is calculated, along with the ratio of average daily demand to average peak-hour demand during the peak month. These values are then multiplied and the resulting product is multiplied by the weighted hourly capacity. This equation is:

Annual Service Volume = Cw x D x H

In this equation Cw corresponds to the weighted hourly capacity, D is the ratio of annual demand to average daily demand during the peak month, and H is the ratio of daily demand to average peak-hour demand during the peak month.

The calculated ASV accounts for differences in forecast activity levels, runway use, aircraft mix, weather conditions, and other factors that occur over a single year. For F45, the projected ASV will slightly decrease throughout the planning period from a high of 381,713 to a low of 280,912, because the aircraft mix index will increase, decreasing the airfield hourly capacity. Future capacity levels for the airport have been calculated based on the forecast annual operations and the ASV for the Airport. These levels are depicted in **Table 1-7**. Based on the forecasts, F45 will not exceed the airport's ASV during the planning period.

TABLE 1-7
Airfield Capacity Levels

Year	Annual Operations	Annual Service Volume	Capacity Level
Base Year			
2004	69,875	381,713	18.3%
Forecast			
2010	78,419	336,934	23.3%
2015	88,007	320,866	27.4%
2020	98,768	301,531	32.8%
2025	110,844	280,912	39.5%

Source: Ricondo & Associates, Inc., September 2005.
Prepared by Ricondo & Associates, Inc.

1.2.3 Summary

The analysis of airfield capacity for F45 clearly identifies that the Airport's existing runway system will not experience a capacity deficiency over the course of the planning period, given current forecasts of future activity levels. As such, the need for future airfield improvements will not be driven by sheer numbers of landings and takeoffs, but will be the result of use of the airport as it relates to runway length to provide for aircraft loads and destinations (stage lengths) from F45.

1.3 Runway Length Requirements

The length of a runway or a system of runways is a critical component that defines the capability of an airport to accommodate specific types of air traffic and to allow aircraft to fly longer stage lengths with high payloads. In a system of airports such as the case in Palm Beach County, various airports are often designed with different roles. For example, PBI is designed to accommodate a wide variety of commercial passenger and cargo aircraft, while also being capable of meeting the needs of some of the largest GA aircraft in the fleet. However, the success of this facility at satisfying its role requires that other facilities in the system act as alternates or relievers for certain segments of demand to allow PBI to more efficiently and cost-effectively meet its primary purpose. In the past, Palm Beach County Park Airport (LNA) has accommodated a significant share of the small GA activity that might otherwise occur at PBI, but LNA is facing significant constraints including limitations on jet operations and a deficiency of area for further ramp and hangar development. As a result, F45 has taken on an increasingly expanding role in the Palm Beach airport system and is the only viable facility to accommodate additional GA growth and additional operations by small to mid-size jets that seek to base and operate away from PBI. Therefore, the capability of the F45 runway system to accommodate this activity efficiently and effectively is a key consideration, particularly given the current limited length of the three runways at F45. While insufficient runway length may preclude operations by specific aircraft and present restrictions of operations for other aircraft, runways that are too long result in unnecessary development and maintenance costs. As such, it is important to

ensure that the airfield runway length provide for a realistic capability to meet the takeoff and landing needs of the aircraft expected at the Airport without overbuilding.

The length of the runway is determined by considering either the family of aircraft having similar performance characteristics or a specific aircraft that operates frequently into and out of the airport or is based at the facility. In either case, the choice is based on the aircraft that currently use, or are forecast to use the runway on a regular basis. As noted in the forecasts for F45, the airport is already home to seven based jet aircraft and is forecast to experience an increase in both based jets and activity by itinerant jet operators. This document is intended to provide a long-term plan for the Airport, so the takeoff runway length requirements analysis considered a group of small and mid-sized business jet aircraft. Because the fleet of aircraft expected to regularly use the Airport will evolve over time, it is prudent to focus on a family of aircraft.

The FAA's computer program derived from AC 150/5325-4B, Runway Length Requirements for Airport Design, in addition to flight planning manuals of specific business jet aircraft, were used to aid in defining the appropriate future runway length at F45.

While the operating weight of the specific aircraft is one consideration in defining takeoff runway length requirements, there are other factors that contribute to the determination of runway length. These factors were also identified and the calculation of runway length needs was adjusted to account for the following required considerations:

- Airport Elevation – F45 is at 22 feet MSL elevation.
- Meteorological Conditions, notably temperature - For this study, takeoff runway lengths were determined for a "hot" day and an average temperature of 90 degrees Fahrenheit was selected to enable comparison of aircraft performance. It should be noted that this is a reasonable assumption and approach as temperatures of 90 degrees and above routinely occur throughout the summer and last for extended periods of the normal summer day.
- Runway Slope – A runway gradient of zero was used.
- Aircraft Takeoff Weight – Maximum takeoff weight was used for each individual aircraft.

1.3.1 Analysis Results

The following text summarizes the results of the runway length analysis that was conducted for F45, and includes a description of the results that were obtained using the FAA Airport Design Software. It also identifies future runway needs based on the aircraft balanced field length requirement obtained on the flight planning manuals of each individual aircraft.

Because the FAA software includes in its computation aircraft that are not necessarily expected to operate at the Airport, further analysis of the runway length needed to accommodate small to mid-size business jets expected at F45 was conducted. This analysis included a review of the balanced field length at maximum takeoff weight found in the characteristic manuals of individual aircraft.

Both of these methods are discussed below.

1.3.1.1 Runway Length Requirement using FAA Airport Design Software

The first method of runway length analysis employed the FAA's runway length computer program that is part of their airport design software package. The FAA program calculates runway length for various classes of aircraft using several inputs including airport elevation, mean daily maximum temperature (of the hottest month), maximum difference in runway centerline elevation, and typical weather conditions (dry or wet runway). The software outputs include runway length requirements by aggregated categories of aircraft adjusted to account for the aforementioned inputs.

Runway lengths are categorized by the percentage of the aircraft fleet of a particular size that can use the runway at a given percentage of their maximum load. An aircraft's load includes passengers and their baggage, cargo, and fuel. To run the software, the mean maximum temperature of the hottest month was set at 90 degrees Fahrenheit and the Airport elevation at 22 feet. Finally, the effective gradient of the runways was assumed to be zero.

Using these data, the Airport Design program provides runway length recommendations for both various categories of the small aircraft fleet (weighing less than 12,500 pounds) and large aircraft (weighing more than 12,500 pounds) according to meeting either 75 percent or 100 percent of the aircraft fleet at either 60 percent of useful load or at 90 percent. **Table 1-8** summarizes the data provided by the program.

TABLE 1-8
FAA Runway Lengths Recommended for Airport Design

Item	Calculated Runway Length	
	Dry Runway	Wet and Slippery Runway
Small airplanes with approach speeds of less than 30 knots	300	300
Small airplanes with approach speeds of less than 50 knots	800	800
Small airplanes with less than 10 passenger seats		
75 percent of these small airplanes	2,510	2,510
95 percent of these small airplanes	3,080	3,080
100 percent of these small airplanes	3,640	3,640
Small airplanes with 10 or more passenger seats	4,260	4,260
Large airplanes of 60,000 pounds or less		
75 percent of these large airplanes at 60 percent useful load	4,650	5,350
75 percent of these large airplanes at 90 percent useful load	6,700	7,000
100 percent of these large airplanes at 60 percent useful load	5,430	5,500
100 percent of these large airplanes at 90 percent useful load	8,310	8,310

Source: FAA AC 150/5325, Runway Length Requirements for Airport Design, Chapter 2.
Prepared by Ricondo & Associates, Inc., September 2005.

Based on the FAA methodology, F45's primary runway length is sufficient for all small aircraft that might be expected to operate at the Airport. However, the current runway

lengths would not accommodate large aircraft weighing between 12,500 and 60,000 pounds, which would include the various business jet models that have been previously noted.

In reviewing the FAA design program results, two outputs appear to set an upper and lower limit of runway length. These consist of the length analyses associated with a reduced percentage of the fleet at a higher load (75 percent of fleet at 90 percent load) and the accommodation of the full fleet at a reduced load (100 percent of fleet at 60 percent load). When the results for these two categories are reviewed, it would appear that a runway length somewhere in the middle would tend to balance the issue of fleet percentage accommodation while also providing for aircraft loading. In short, it would appear that a runway length in the 6,000-foot range would provide for fleet coverage at a payload and range level that would meet the majority of user needs.

1.3.1.2 Runway Length Calculation using Aircraft Characteristics Manuals

Aircraft characteristics manuals of a selected set of business jets were reviewed to obtain the balanced field length at maximum takeoff weight. **Table 1-9** summarizes the results of this analysis, while **Exhibits 1-1, 1-2, and 1-3** depict the analysis results.

TABLE 1-9
Business Jet Aircraft Takeoff Runway Length Requirement

Aircraft Manufacturer	Aircraft Model	Jet Aircraft Category	ARC	Required Dry Runway Takeoff Length (ft)	Required Wet Runway Takeoff Length (ft)
Bombardier	Learjet 35A/36A	Light	C-I	5,753	6,616
Cessna	Citation Bravo	Light	N/A	4,166	4,791
Cessna	Citation Encore	Light	N/A	4,039	4,644
Cessna	Citation I	Light	B-I	3,564	4,099
Cessna	Citation II	Light	B-II	3,992	4,591
Cessna	Citation Mustang	Light		3,610	4,152
Cessna	Citation Ultra	Light	B-II	3,680	4,232
Cessna	Citation V	Light	B-II	3,657	4,205
Mitsubishi	MU-300 Diamond	Light	B-I	4,976	5,722
Raytheon/Beechcraft	Beechjet 400A	Light	B-I	4,964	5,709
Bombardier	Learjet 40	Midsize	C-I	5,006	5,757
Bombardier	Learjet 45XR	Midsize	C-I	5,855	6,734
Bombardier	Learjet 55C	Midsize	C-I	6,478	7,450
Cessna	Citation III	Midsize	B-II	5,959	6,853
Cessna	Citation Sovereign	Midsize	N/A	4,275	4,916
Cessna	Citation VI	Midsize	C-II	5,959	6,853
Cessna	Citation VII	Midsize	C-II	5,427	6,241
Cessna	Citation X	Midsize	C-II	5,948	6,840
Dassault	Falcon 10	Midsize	B-I	5,207	5,988
Dassault	Falcon 20-5	Midsize	B-II	6,735	7,745
Israel Aircraft Industries	Astra 1126 Galaxy/ Gulfstream G200	Midsize	C-II	6,364	7,319

TABLE 1-9
Business Jet Aircraft Takeoff Runway Length Requirement

Aircraft Manufacturer	Aircraft Model	Jet Aircraft Category	ARC	Required Dry Runway Takeoff Length (ft)	Required Wet Runway Takeoff Length (ft)
Israel Aircraft Industries	Astra1125 SP	Midsize	C-II	6,133	7,053
Israel Aircraft Industries	Astra 1125 SPX/Gulfstream G100	Midsize	C-II	6,243	7,179
Israel Aircraft Industries	Westwind 1124A	Midsize	C-I	6,075	6,986
Raytheon	Hawker 125-800XP	Midsize	B-II	5,821	6,694
Raytheon	Hawker 125-1000 Horizon	Midsize	B-II	6,075	6,986
Bombardier	Challenger 604	Heavy	C-II	6,758	7,772
Bombardier	Challenger 800	Heavy	C-II	7,284	8,377
Dassault	Falcon 2000	Heavy	B-II	6,729	7,738
Dassault	Falcon 50EX	Heavy	B-II	5,659	6,507
Dassault	Falcon 900EX	Heavy	B-II	6,035	6,940
Gulfstream	Gulfstream II	Heavy	C-II	6,509	7,485
Gulfstream	Gulfstream III	Heavy	C-II	5,919	6,807

Sources: Aircraft Performance Manuals.

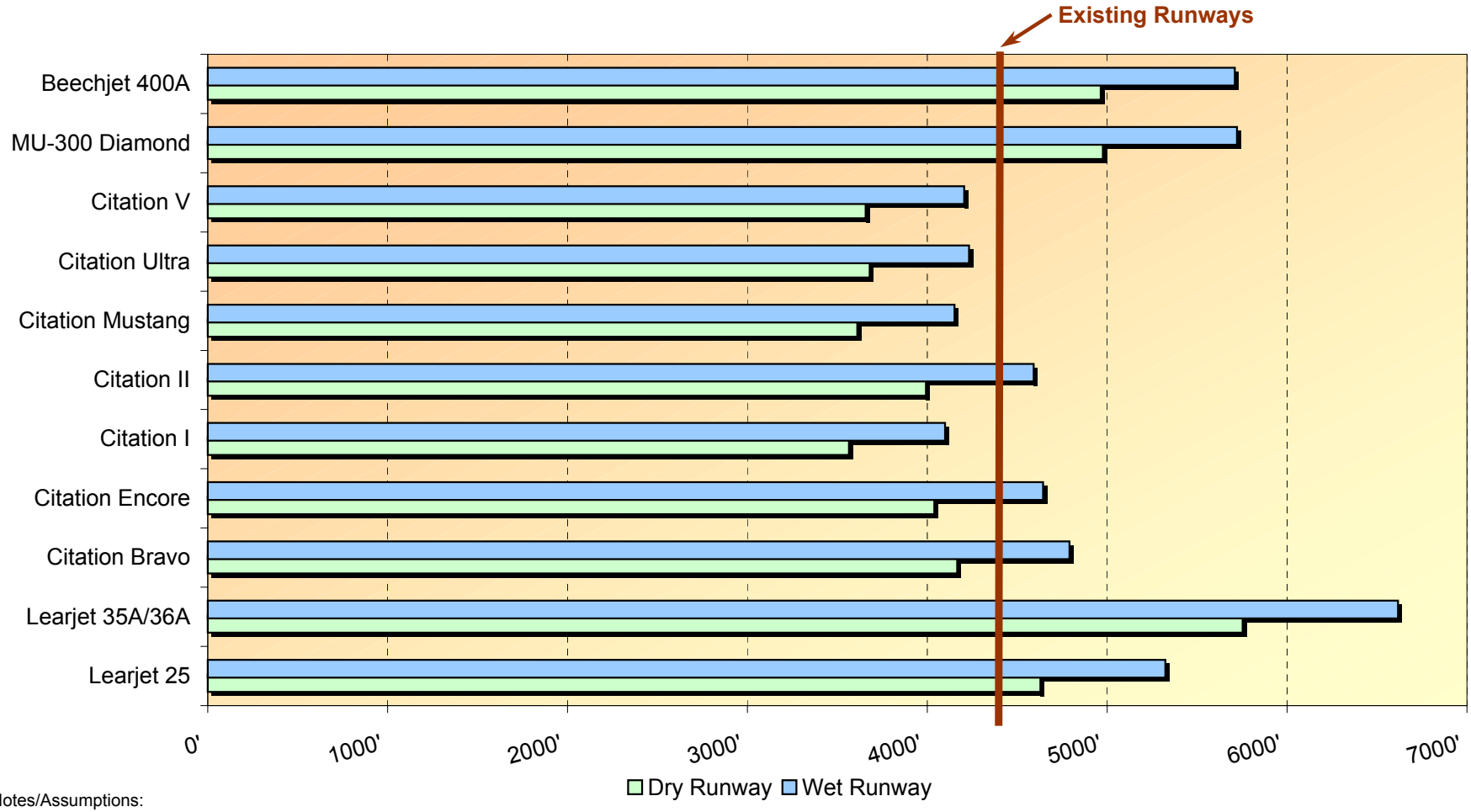
Notes:

These data assume an airport elevation of 22 feet, a temperature of 90 degrees Fahrenheit, MTOW, and zero wind. Altitude corrections assume a takeoff length increase of 7 percent per 1000 feet above sea level. Temperature correction assumes a takeoff length increase of 0.50 percent per degree above the adjusted standard temperature. The difference between the runways low and high points is assumed to be zero. Wet runway takeoff length requirements assume an increase of the dry runway takeoff lengths by 15 percent.

Prepared by: Ricondo & Associates, Inc., May 2005.

The aircraft listed represent some, but not necessarily all of the fleet of business jet aircraft expected to use the Airport on a regular basis, resulting in more than the required threshold of operations to support the need for additional takeoff runway length. Based on this analysis and the runway length requirements associated with the small to mid-size business jets, it is clear that a portion of the light business jet fleet can be accommodated by the current 4,300-foot-long runways; however, several light jet models and most of the mid-size jets would face weight penalties that could significantly affect their ability to operate. Although this is not a complete list of the aircraft expected to use the airfield, it does provide greater detail than the more general figures calculated by the FAA software. For purposes of this analysis the fleet of business jets anticipated at the Airport was divided into three classifications based on their published maximum takeoff weight (MTOW). These groups consist of:

- Light Business Jet Aircraft consisting of business jets weighing less than 18,500 pounds
- Mid-Size Business Jet Aircraft consisting of business jets between 18,500 pounds and 37,000 pounds
- Heavy Business Jet Aircraft consisting of business jets weighing more than 37,000 pounds



Notes/Assumptions:

1/ Data are shown for a zero runway gradient, zero wind, and air conditioning off.

2/ Each value has been corrected to reflect the Airport elevation of 22 feet.

These altitude corrections assume a takeoff length increase of 7% per 1000 feet above sea level.

3/Temperature correction assumes a takeoff length increase of 0.50% per degree above the adjusted standard temperature.

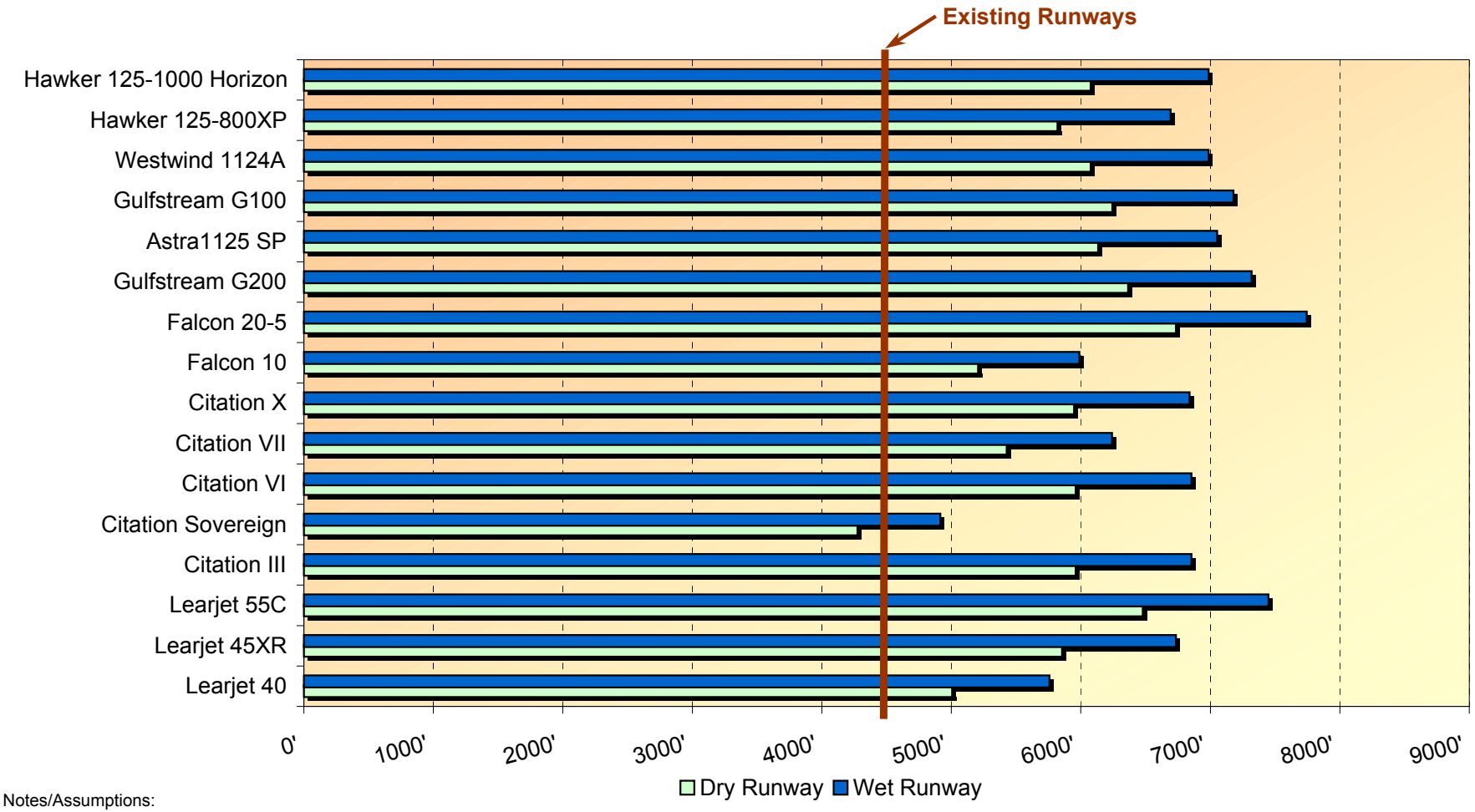
Exhibit 1-1

Light Business Jet Aircraft Takeoff Length Requirements (at MTOW)

October 2006

Sources: Airplane Characteristics Manuals

Prepared by: Ricondo & Associates, Inc.



Notes/Assumptions:

1/ Data are shown for a zero runway gradient, zero wind, and air conditioning off.

2/ Each value has been corrected to reflect the Airport elevation of 22 feet.

These altitude corrections assume a takeoff length increase of 7% per 1000 feet above sea level.

3/Temperature correction assumes a takeoff length increase of 0.50% per degree above the adjusted standard temperature.

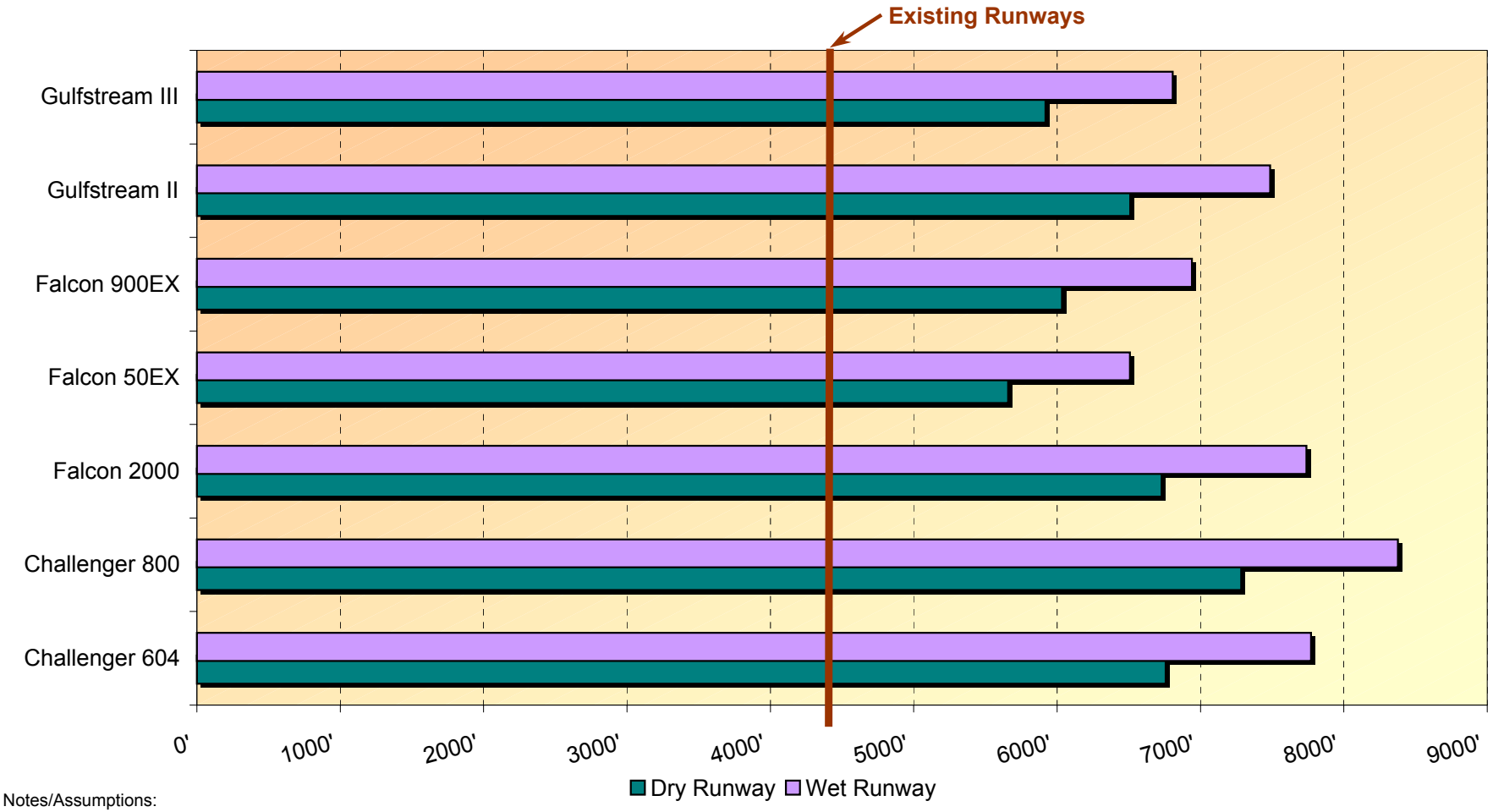
Exhibit 1-2

Midsize Business Jet Aircraft Takeoff Length Requirements (at MTOW)

October 2006

Sources: Airplane Characteristics Manuals

Prepared by: Ricondo & Associates, Inc.



Notes/Assumptions:

1/ Data are shown for a zero runway gradient, zero wind, and air conditioning off.

2/ Each value has been corrected to reflect the Airport elevation of 22 feet.

These altitude corrections assume a takeoff length increase of 7% per 1000 feet above sea level.

3/Temperature correction assumes a takeoff length increase of 0.50% per degree above the adjusted standard temperature.

Exhibit 1-3

Heavy Business Jet Aircraft Takeoff Length Requirements (at MTOW)

October 2006

Sources: Airplane Characteristics Manuals

Prepared by: Ricondo & Associates, Inc.

The runway length requirements for each of the aircraft listed in Table 1-9 indicate that:

- Light jet aircraft with the exception of the Bombardier Learjet 35A/36A can operate on 5,000 feet of runway at MTOW under dry runway conditions. The Learjet 35A is a popular aircraft in the U.S. business jet fleet.
- With the exception of the Dassault Falcon 20-5, mid-size jet aircraft can operate on a runway of up to 6,400 feet at MTOW under dry runway conditions given temperature conditions in the area.
- With the exception of the Bombardier Challenger 800, heavy jet aircraft that fall within Approach Category C and Design Group II could operate on a runway of 7,000 feet and, in several cases, less at MTOW under dry runway conditions, although it is assumed that most of the aircraft in this category would opt to use PBI.
- Runway length requirements for light jet aircraft under dry and wet runway conditions average 4,275 and 4,917 feet, respectively.
- Runway length requirements for midsize jet aircraft under dry and wet runway conditions average 5,848 and 6,725 feet, respectively.
- Runway length requirements for heavy jet aircraft under dry and wet runway conditions average 6,400 and 7,350 feet, respectively.
- Runway length requirements for all aircraft under dry and wet runway conditions average 5,480 and 6,302 feet, respectively.

In light of this information, it is clear that runway length requirements vary considerably from one aircraft type to another. While it would be ideal to construct a runway that would fully satisfy the length requirements in both wet and dry conditions and for all aircraft types identified in the analysis, this is not a reasonable or financially realistic approach. It is clear that an enhancement to runway length at F45 is needed for the Airport to properly serve in its role as a reliever for PBI, and to do so effectively requires that F45 be capable of providing facilities for both the very small piston aircraft (up to and including providing an outlet for a portion of the business jet fleet). In so doing, F45 can aid PBI in fulfilling its primary goal as the principal commercial service airport serving a multi-county market area.

In addressing runway length at F45 it was determined through discussions with the DOA that a runway length adequate to meet the needs of the entire fleet of light jets operating under dry conditions should be considered. Additionally, the selected runway length should also provide for a significant share of the fleet of mid-size jets under dry operational conditions. After reviewing the results of the analysis as presented in Table 1-9 it was apparent that an extension of one of the two paved runways at F45 to a total length of 6,000 feet would satisfy this need and was well supported by the results of the analysis and by the characteristic and popularity of the aircraft types that could be accommodated by this length of runway. Aircraft including the Citation III; Learjet 35 and 45; Citation VI, VII, and X; and Hawker 125-800 are all common business jet models and routinely operate in the Palm Beach market. Meeting the needs of the small and mid-size jets, along with the piston and turbo-prop market, is consistent with the role that F45 needs to play in the region, given limitations emerging at PBI and those that preclude such a role at LNA. For planning

purposes, and based on the identified need, it is recommended that either Runway 8R/26L or Runway 13/31 be extended to provide a total available length of 6,000 feet for landings and takeoffs at F45.

The preceding sections have discussed the design-related requirements associated with the existing airfield at F45, along with proposed changes in the ARC that need to be considered to meet the expected activity over the course of the planning period. Additionally, this analysis also reviewed the basis for considering an extension to one of the two paved runways at F45 to a length of 6,000 feet. The study has noted that the proposed length would enhance the capability of the airport to act in its role as a reliever facility to PBI, while at the same time balancing the length of the extension with a realization that while additional length could have been recommended and justified, the proposed extension is a reasonable and economically realistic enhancement that does not duplicate facilities available within the Palm Beach system of airports.

1.4 Navigational Aids

Runway approach instrumentation, lighting, and other navigational aids (NAVAIDs) provide pilots with the necessary means to navigate aircraft safely and efficiently in most weather conditions. The following sections provide an overview of the existing instrumentation, airport approach capabilities, and lighting at F45.

1.4.1 Precision Approach NAVAIDs

Precision Approach NAVAIDs assist aircraft performing precision instrument approach procedures by providing course and glide slope information to a point just beyond the approach end of the runway. F45 has a precision Instrument Landing System (ILS) installed on Runway 8R. Given the low occurrence of IMC, the ILS is adequate to support the Airport's mission.

1.4.2 Non-Precision Approach NAVAIDs

Non-Precision Approach NAVAIDs assist aircraft performing instrument approach procedures by providing course bearing guidance to a point near the runway environment. Non-precision instrument approaches to F45 are guided by the PBI VOR. This facility provides support for non-precision VOR instrument approaches as well as enroute and terminal navigation support. F45 also maintains a non-precision global positioning system (GPS) approach for Runways 8R and 26L. The non-precision approaches at F45 are adequate to support the Airport's mission; however, additional non-precision approaches would be acceptable to allow operations on other runways.

1.4.3 Visual Approach NAVAIDs

Visual Approach NAVAIDs provide aircraft guidance once an aircraft is within sight of an airport and aids in the orderly transfer from flight to landing. A pilot-controlled lighting system is available at F45 to pilots between dusk and dawn, along with pavement edge lighting on Runways 13/31 and 8R/26L. Runway 8R/26L is equipped with high intensity runway lights (HIRL), while Runway 13/31 is equipped with medium intensity runway lights (MIRL). Runways 13, 31, 8R, and 26L have runway end identifier lights (REIL), and

Runways 8R/26L and 13/31 have a four light precision approach path indicator (PAPI) system. These navigational aids have been deemed adequate to serve the needs of the Airport.

1.5 Airport Design Standards

For airfield planning purposes, the ARC, along with the approach visibility minimums directly affect the size of the surfaces associated with each runway, including the Runway Safety Area (RSA), Runway Obstacle Free Zone (OFZ), Runway Object Free Area (OFA), and Runway Protection Zone (RPZ). **Table 1-10** depicts the standard dimensions for B-II runways, along with the surface dimensions that exist for each runway at F45. As mentioned earlier, the ARC of one of the runways at F45 should be upgraded to C-II design standards, while the other runways should remain at B-II standards. **Table 1-11** shows the standard dimensions required for runways with an ARC of C-II. Currently, all runways meet the design standards for category B-II runways, but as Table 1-11 shows, upgrades to the existing dimensions would be required to satisfy C-II standards.

TABLE 1-10
B-II Runway Dimensional Standards

		Existing Runway Dimensions					
Design Criteria	**B-II Standard Dimensions**	**8R**	**26L**	**8L**	**26R**	**13**	**31**
Runway Width	**75'**	100'	100'	75'	75'	75'	75'
Runway Safety Area:							
- Width	**150'**	150'	150'	150'	150'	150'	150'
- Length Beyond Runway End	**300'**	300'	300'	300'	300'	300'	300'
Runway Object Free Area:							
- Width	**500'**	500'	500'	500'	500'	500'	500'
- Length Beyond Runway End	**300'**	300'	300'	300'	300'	300'	300'
Runway Protection Zone:							
- Inner Width	**1,000' [1/] 500 [2/]**	1,000'	1,000'	500'	500'	500'	500'
- Outer Width	**1,510' [1/] 700' [2/]**	1,750'	1,510'	700'	700'	700'	700'
- Length	**1,700' [1/] 1,000' [2/]**	2,500'	1,700'	1,000'	1,000'	1,000'	1,000'
Runway Obstacle Free Zone:							
- Width	**250'**	250'	250'	250'	250'	250'	250'
- Length Beyond Runway End	**200'**	200'	200'	200'	200'	200'	200'

Notes:
[1/] Approach Visibility Minimums not lower than 3/4 mile.
[2/] Visual runway and not lower than one mile.
Source: FAA AC 5300-13, Change 10, Airport Design.
Prepared by: CH2M HILL, October 2006

TABLE 1-11
C-II Runway Dimensional Standards

Design Criteria	ARC C-II Standard Dimensions	Existing Runway Dimensions					
		8R	26L	8L	26R	13	31
Runway Width	**100'**	100'	100'	75'	75'	75'	75'
Runway Safety Area:							
- Width	**500'**	150'	150'	150'	150'	150'	150'
- Length Beyond Runway End	**1,000'**	300'	300'	300'	300'	300'	300'
Runway Object Free Area:							
- Width	**800'**	500'	500'	500'	500'	500'	500'
- Length Beyond Runway End	**1,000'**	300'	300'	300'	300'	300'	300'
Runway Protection Zone:							
- Inner Width	**500 [1/] 1,000 [2/]**	1,000'	500'	500'	500'	500'	500'
- Outer Width	**1,010 [1/] 1,750 [2/]**	1,510'	700'	700'	700'	700'	700'
- Length	**1,700 [1/] 2,500 [2/]**	1,700'	1,000'	1,000'	1,000'	1,000'	1,000'
Runway Obstacle Free Zone:							
- Width	**250'**	250'	250'	250'	250'	250'	250'
- Length Beyond Runway End	**200'**	200'	200'	200'	200'	200'	200'

[1/] Visual and not lower than 1-mile.
[2/] Lower than 3/4 mile.
Source: FAA AC 5300-13, Change 10, Airport Design.
Prepared by: CH2M HILL, October 2006

1.6 Part 77 Surface Area

Federal Aviation Regulations (FAR) Part 77, "Objects Affecting Navigable Airspace," establishes standards for determining which structures pose potential obstructions to air navigation. This is accomplished by defining specific "Imaginary Surfaces" around an airport that should not contain any protruding objects. Objects affected include existing or proposed objects of natural growth, terrain, or construction, including equipment, which is permanent or temporary in character. Dimensions of Part 77 surfaces (primary, approach, transitional, conical, and horizontal) vary depending on the type of runway approach. These surfaces are analyzed in the Airport Plans section.

SECTION 2

GA/FBO Demand/Capacity and Facility Requirements

The GA/FBO demand/capacity analysis includes tenant facilities that serve based and transient GA aircraft, including temporary aircraft storage and/or flight support services. For the purposes of this analysis, these facilities include the FBO terminal building, aircraft parking aprons, aircraft hangars, automobile parking facilities, and fueling facilities.

The FBO terminal demand/capacity and facility requirements analyses were conducted at a macro level of detail. The methodology for assessing future terminal facilities requirements was based on discussions with Airport staff and the FBO manager, as well as a predefined ratio of terminal square footage to number of annual GA aircraft operations.

The sole FBO at F45 is Landmark Aviation, which leases hangars, office space, and apron space to airport users. Landmark Aviation also provides fueling services for all tenants at F45. Currently, there are two different apron areas at the Airport, both operated by Landmark Aviation. The first apron, which has an area of 364,950 square feet, is designated for transient aircraft and is located adjacent to the FBO building and corporate hangars. The second apron, located southwest of, and adjacent to the transient aircraft apron, is dedicated for based aircraft and has an area of 459,450 square feet.

There are four types of hangars at the Airport: corporate hangars (two units with a total of 33,800 square feet of space), conventional hangars (28 units with a total of 73,330 square feet of space), t-hangars (150 units with a total of 219,840 square feet of space), and shade ports (10 units with a total of 11,940 square feet of space). Combined, the hangars provide 338,910 square feet of aircraft storage at the Airport.

Associated with these facilities and the terminal building are four automobile parking areas. One parking area is adjacent to and serves the terminal area, and a second parking area is adjacent to and serves the northernmost t-hangars. The remaining two parking areas are adjacent to and serve the southern hangars. In total, there are 313 automobile parking spaces in these parking areas.

For the purpose of determining facility requirements, it is important to examine the GA operations forecast. This forecast for F45 was developed in September 2005 and was approved by the FAA in February 2006. Based on an average annual growth rate of 2.3 percent, the number of GA aircraft operations is forecast to increase from 70,850 operations in 2005 to 110,844 operations in 2025. The number of based aircraft at the Airport is forecast to increase an average of 2.1 percent per year, from 218 based aircraft in 2005 to 329 based aircraft in 2025.

It should be noted that in May 2006, the Palm Beach County Department of Airports provided an updated based aircraft count, which estimated that the Airport currently has 250 to 300 based aircraft. Assuming the same average annual growth rate as in the baseline forecast, 2.1 percent—up to 407 based aircraft would be anticipated in 2025. Given that FAA approval was given on the original forecast, facility requirements were calculated on the

original based aircraft forecast. It should be noted that the requirements calculated in this section may therefore be conservative. **Table 2-1** summarizes the baseline GA operations forecast.

TABLE 2-1
General Aviation Aircraft Operations and Based Aircraft

	Existing (2005)	2010	2015	2020	2025
Baseline Forecast [1/]:					
Annual Operations	70,850	78,419	88,007	98,768	110,844
Based Aircraft	218	239	266	296	329

Sources: North Palm Beach County General Aviation Airport Aviation Activity Forecasts, Ricondo & Associates, Inc., September 2005; Palm Beach County Department of Airports, May 2006; Ricondo & Associates, May 2006.
Prepared by: Ricondo & Associates, Inc., June 2006.

Notes:
[1/] Based on forecast developed for F45 in September 2005. This forecast was approved by the FAA in February 2006.

2.1 FBO Terminal Building

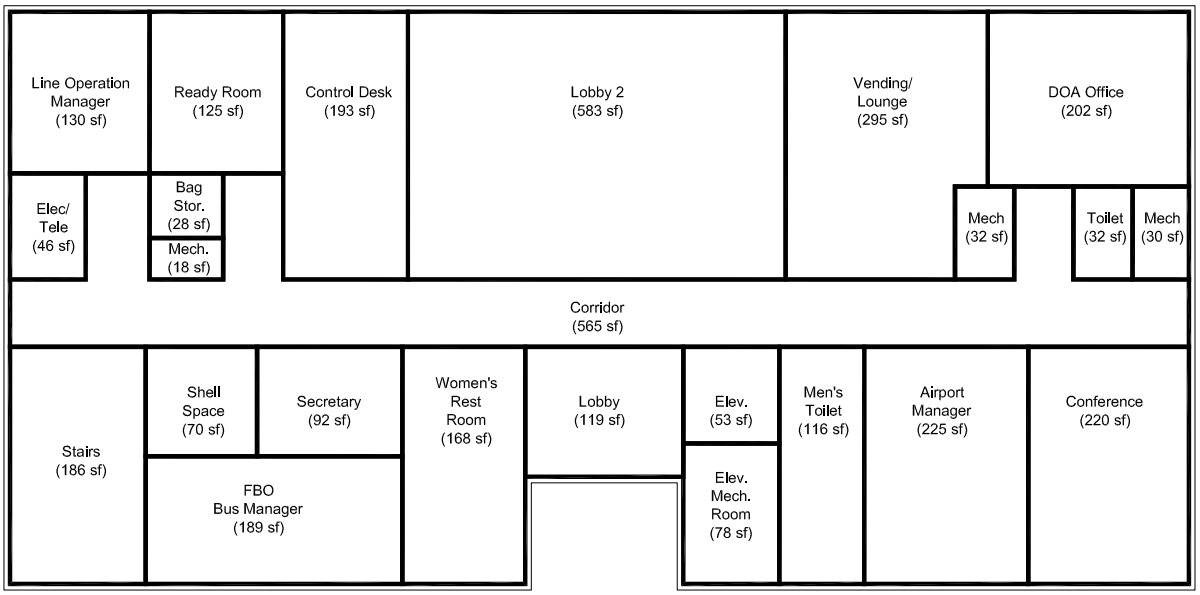
2.1.1 Existing Terminal Building

The Airport opened in 1994; therefore, the GA facilities, including the 6,808 square-foot terminal building, are in good condition. The two-story terminal building is owned by Palm Beach County and is leased to three main tenants: Landmark Aviation, the only FBO at the Airport; Barry Aviation Florida, a sailplane manufacturer; and Sunquest Aviation, a Federal Aviation Regulation (FAR) Part 141 fixed-wing aircraft flight training school. Landmark Aviation and the Palm Beach County Department of Airports occupy the first level of the terminal building, while Barry Aviation Florida and Sunquest Aviation occupy the second level. The layout plan of the terminal building is illustrated in **Exhibit 2-1**.

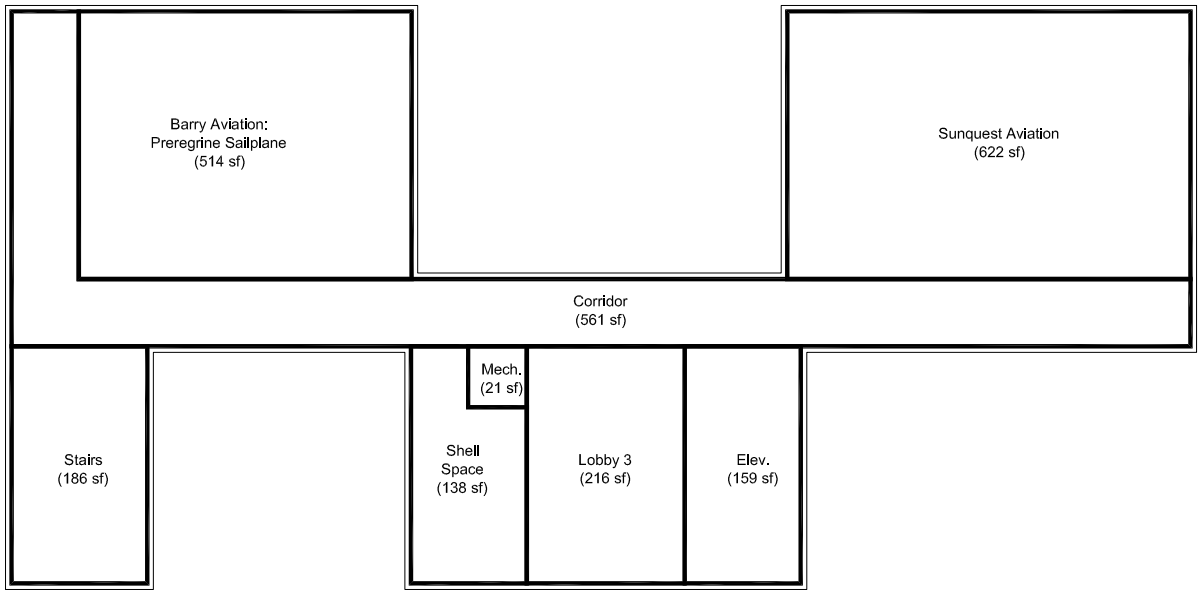
2.1.2 Future Terminal Building Needs

The forecast developed for F45 in October 2005 served as the basis for determining future facility needs at the Airport. Aircraft operations are forecasted to increase an average of 2.3 percent per year over the planning horizon, totaling 110,844 in 2025. Tenants occupying the existing terminal building indicate that the facility is adequate to serve the existing demand. On that basis, a ratio of terminal building square footage to number of annual GA operations was determined for F45, and compared to that for other GA airports to derive future facility needs for the Airport.

Table 2-2 summarizes the facility requirements for the F45 terminal building. As shown, a target ratio of 0.10 square foot per annual GA aircraft operation was considered to determine future facility needs. This ratio was based on calendar year 2005 demand, because it was the most recent full year of reported operations, and the existing terminal building size. Given the ability of the terminal to serve existing demand, it was deemed reasonable to use this ratio for planning purposes. For comparison, ratios of terminal building square footage to annual GA aircraft operations at other airports were analyzed.



First Floor



Second Floor

First Floor: 3,958 square feet
Second Floor: 2,850 square feet
Total: 6,808 square feet

Source: Design Drawings, Willams, Hatfield, and Stoner, Inc., October 1994.
Prepared by: Ricondo & Associates, Inc., June 2006.

Exhibit 2-1

0 175 ft.

General AviationTerminal Layout Plan

Drawing: P:\Airports\PalmBeach-System\PhaseII\Ch3_DemandCapacity(MP)\F45\Exhibit 2-1.dwg Layout: Layout4_Oct 23, 2006, 11:33am

TABLE 2-2
Terminal Building Facility Requirements Summary

	Annual Aircraft Operations	Terminal Building Area (Square Feet)
Existing:		
2005	70,850	6,808
Forecast:		
2010	78,419	7,842
2015	88,007	8,801
2020	98,768	9,877
2025	110,844	11,084

Target Ratio:

Terminal Building: 0.10 square foot per annual general aviation operation

Other Airport Ratios of Terminal Building Space per Annual Operation for Calendar Year 2005:

PBI: 0.26 square foot per annual general aviation operation

LNA: 0.03 square foot per annual general aviation operation

BCT: 0.12 square foot per annual general aviation operation

F45: 0.10 square foot per annual general aviation operation

Sources: FAA *Terminal Area Forecast*, February 2006; Ricondo & Associates, Inc., May 2006.
Prepared by: Ricondo & Associates, Inc., May 2006.

Notes:
PBI: Palm Beach International Airport
LNA: Palm Beach County Park Airport
BCT: Boca Raton Airport
F45: North Palm Beach County General Aviation Airport

At PBI, LNA, and Boca Raton Airport (BCT), the ratios were determined to be 0.26, 0.03, and 0.12, respectively. It should be noted, however, that GA operations at PBI are mainly of the corporate type and are served by three FBOs. By contrast, at LNA, aircraft operations are mainly conducted by single and twin-engine aircraft due to noise restrictions at the airport, which prohibit "all jet aircraft in addition to all aircraft weighing in excess of 12,500 pounds engaged in aircraft cargo operations" from using LNA.

LNA is served by one FBO. BCT is compared to F45, where a mix of corporate aircraft operations and GA activities are served. The ratio of 0.12 currently shown reflects a time prior to the opening of BCT's second FBO and is similar to the existing ratio at F45 of 0.10. As Table 2-2 shows, the total terminal building space at F45 is forecast to nearly double by 2025.

2.1.3 Potential Second FBO

The PBC DOA operates a system of four airports, including PBI, Palm Beach County Glades Airport (PHK), LNA, and F45. LNA and F45 are both designated by the FAA as reliever

airports. The purpose of a reliever airport is to provide alternatives for GA users that help relieve congestion at nearby commercial service airports.

Since F45 opened in 1994, GA activity at PBI has in fact decreased to mostly corporate traffic. Palm Beach County's three GA airports accommodate most of the private GA demand in the region. While LNA is designated as a reliever airport for PBI, noise restrictions currently prohibit jet aircraft from flying into that airport. In recognition of each airport's capacity and operational constraints, and in an attempt to evaluate future facility needs at F45, it is helpful to analyze what has been considered at other GA airports in terms of adding a second FBO. Vandenberg Airport (VDF) for instance, which serves Hillsborough County and the metropolitan Tampa area, has one FBO and accommodated 74,742 GA aircraft operations in 2005. VDF's facility requirements for a second FBO included a total of 11.2 acres encompassing a terminal building, aircraft storage and maintenance hangars, tenant lease space, and tiedown areas. This second FBO has not been built yet because the demand has not materialized. At BCT, AVITAT, a second FBO began operations in November 2004 on a 15-acre parcel. This FBO has a state-of-the-art terminal building and provides storage hangars and fuel services.

For comparison purposes, **Table 2-3** presents a list of various airports in Florida, their 2005 GA aircraft operations, and the FBO's currently operating at the airports. Based on the airports that accommodated at least 88,000 annual operations (i.e., BCT and Witham Field Airport [SUA]), two FBOs seem to be justified. Given the F45 forecast of 110,844 operations in 2025, consideration for a second FBO within the 20-year timeframe seems reasonable. Based on future terminal building requirements for F45 and experience at other GA airports, it is estimated that a parcel of approximately 12 acres[5] should be preserved as part of the alternatives analysis should the 20-year development plans for the Airport include a second FBO facility. This parcel would accommodate the following main functions:

- FBO Terminal Building
- Maintenance Hangars
- Storage Hangars
- Aircraft Apron
- Fuel Farm
- Automobile Parking Facility

2.2 Aircraft Apron Requirements

Aircraft parking apron and hangar requirements (discussed in the following subsection) were determined utilizing the baseline forecast for based aircraft at the Airport. It was also necessary to determine how many aircraft were on the ramps during a busy day of the peak month, as recommended in FAA AC 150/5300-13, Change 10, *Airport Design*. Due to a lack of monthly aircraft operations data, it was estimated that the peak month at the Airport represented approximately 10 percent of annual aircraft operations. This estimate is

[5] Minimum requirements for FBO's call for ten acres.

consistent with GA activity statistics at PBI. The peak month average day (PMAD) operations were derived by dividing the peak month operations by 31 (assuming that the

TABLE 2-3
FBO and General Aviation Aircraft Operations Summary at Specific Florida Airports

Airport	FBOs	General Aviation Operations (CY 2005)
Tampa International Airport (TPA)	Raytheon	42,733 [1/]
	Jet Center	
Vandenberg Airport (VDF)	Leading Edge Aviation	74,742 [2/]
Page Field Airport (FMY)	Page Field Aviation Center	82,976 [2/]
Boca Raton Airport (BCT)	Boca Aviation	88,627 [3/]
	Avitat Boca Raton	
Witham Field Airport (SUA)	Galaxy Aviation	88,950 [2/]
	AVITAT	
Palm Beach International Airport (PBI)	Signature Flight Support	126,236 [4/]
	Jet Aviation	
	Galaxy Aviation	
Kendall-Tamiami Executive Airport (TMB)	Reliance Aviation	178,801 [2/]
	Falcon Trust Air	
	International Flight Center	
Fort Lauderdale Executive Airport (FXE)	Aztec Jet Center	192,366 [2/]
	Banyan	
	World Jet, Inc.	

Sources: FAA TAF, February 2006.
Prepared by: Ricondo & Associates, Inc., May 2006.

Notes:
[1/] Obtained from the Airport traffic reports.
[2/] Data obtained from FAA *Terminal Area Forecast*, February 2006.
[3/] Obtained from Boca Raton Airport Authority; Operations shown were for CY 2004, before Avitat opened.
[4/] Airport Traffic Report for General Aviation Activities, Palm Beach International Airport, CY 2005; FAA Air Traffic Activity Data System (ATADS), CY 2005.

peak month is March, similar to PBI). To account for busy day conditions, FAA AC 150/5300-13 recommends that the busy day activity be considered to be 10 percent higher than average day activity. Discussions with the PBC DOA also revealed that approximately 20 percent of the activity at F45 is transient. On that basis, the number of aircraft on the transient ramp was estimated to be 26 in 2005 and 41 in 2025. **Table 2-4** summarizes the transient aircraft on the ramp in a busy day.

TABLE 2-4
Transient Ramp Facilities

	Existing (2005)	2010	2015	2020	2025
General Aviation Operations					
Annual General Aviation Operations	70,850	78,419	88,007	98,768	110,844
Peak Month Operations	7,085	7,841	8,800	9,876	11,084
Peak Month Average Day	236	261	293	329	369
Busy Day [1/]	260	288	323	362	406
Number of Aircraft on Ground	130	144	161	181	203
20 percent Transient	26	29	32	36	41

Sources: Palm Beach County Department of Airports, May 2006; North County Airport Aviation Activity.
Forecasts: Ricondo & Associates, Inc., September 2005; Ricondo & Associates, Inc., May 2006.
Prepared by: Ricondo & Associates, Inc., June 2006.

Note:
[1/] Accounts for 10 percent increase in activity for busy day conditions.

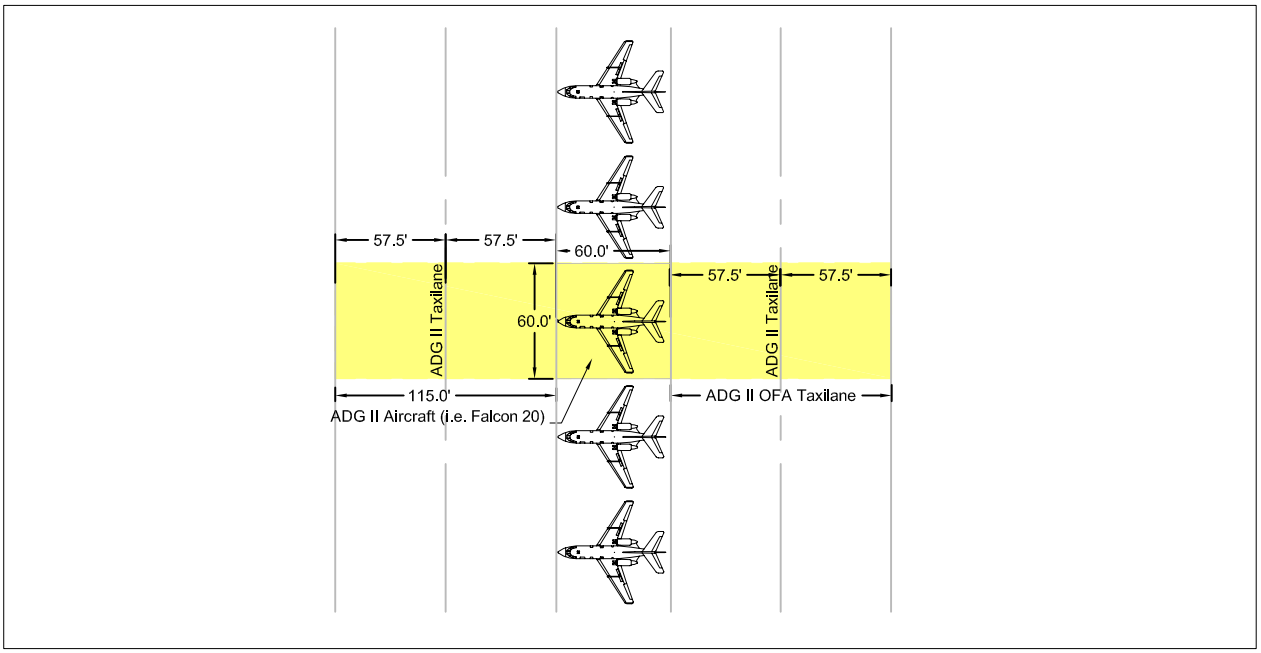
The next step in this analysis was to determine the average apron space required per transient aircraft at the Airport. Based on the forecast, the Cessna Citation (VI/VII) and Falcon 20 represent the aircraft with the largest wingspan expected to use the Airport regularly. These aircraft, which have a wingspan of less than 55 feet, are included in ADG II, with an approach speed category B (less than 121 knots). Therefore, it was deemed reasonable to assume that a typical apron space at F45 would accommodate a B-II type aircraft. The transient ramp space resulted in 17,400 square feet per aircraft.

This space requirement encompasses a taxilane on each side of the apron, including taxilane object free area (OFA) clearances. This is illustrated in **Exhibit 2-2**.

For the based aircraft ramp requirements, a similar methodology was used. However, it was necessary to determine how many based aircraft were not stored in a hangar. By definition, based aircraft that are not stored in hangars are typically accommodated on the ramp. Based on discussions with Airport staff and data from Chapter One of this Master Plan Update, *Inventory*, approximately 32 percent of the based aircraft at F45 are not stored in hangars. Given the majority of single engine aircraft are currently based on the ramp, a B-I aircraft type was assumed for the typical based aircraft type that would be parked on the apron. This assumption resulted in a requirement of 6,450 square feet per based aircraft, which encompass one taxilane, as well as the necessary OFA clearances.

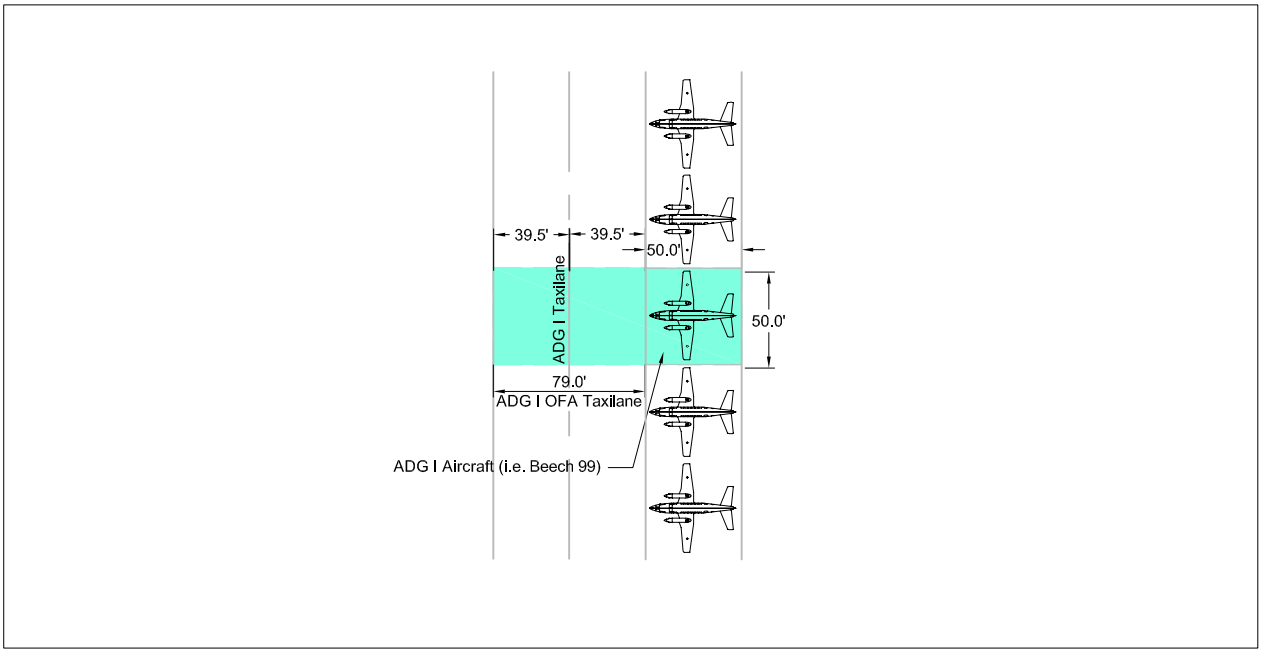
Apron requirements for based and transient aircraft are summarized in **Table 2-5**. As shown, the capacity of both types of aprons is currently insufficient to accommodate demand. Currently, the transient aircraft apron is approximately 36 percent deficient, while the based aircraft apron is approximately 8 percent deficient. As Table 2-5 shows, these requirements continue to increase until 2025. Overall, the total aircraft apron for transient and based aircraft is forecast to be deficient by an estimated 85 percent by 2025.

Transient Aircraft Apron



Total apron space assumed per transient aircraft: 17,400 square feet

Based Aircraft Apron



Total apron space assumed per based aircraft: 6,450 square feet

Source: FAA AC 150/5300-13, Change 10, *Airport Design;* Ricondo & Associates, Inc., June 2006.
Prepared by: Ricondo & Associates, Inc., June 2006.

Exhibit 2-2

0 100 ft.

Apron Space Assumptions per Aircraft

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TABLE 2-5
Apron Facility Requirements Summary[1/]

	Existing Apron (2005)							
	Actual	Surplus	Deficiency	Recommended[4/]	2010	2015	2020	2025
Baseline Forecast:								
Transient Apron (square feet)[2/]	364,950	-	(132,275)	497,225	550,281	617,584	693,098	777,875
Based Aircraft Apron (square feet)[3/]	459,450	-	(35,497)	494,947	542,626	603,926	672,038	746,962
Total Apron (square feet)	824,400	-	(167,773)	992,173	1,092,907	1,221,510	1,365,136	1,524,837
Percent Increase From Existing Conditions				8%	18%	31%	46%	63%

Sources: Palm Beach County Department of Airports, May 2006; Ricondo & Associates, September 2005; Ricondo & Associates, May 2006.
Prepared by: Ricondo & Associates, Inc., June 2006.
Notes:
[1/] Accounts for 10 percent increase in activity for busy day conditions.
[2/] Assuming an average of 17,400 square feet per transient aircraft for transient apron.
[3/] Assuming 6,450 square feet per based aircraft for based aircraft apron.
[4/] Represents the recommended apron for 2005 based on existing demand at the Airport.

2.3 Hangar Facility Requirements

In 2005, 32 percent of the aircraft at the Airport were stored on the apron, while the remaining 68 percent were accommodated in hangars. An analysis for hangar space was conducted for the following categories of hangars: (1) t-hangars/shade ports, (2) corporate hangars, and (3) conventional hangars. This analysis was based on the forecast of based aircraft by type presented in the North County Airport Aviation Activity Forecast Report. As such, future hangar facility requirements were based on a pre-determined square footage of hangar per based aircraft. **Table 2-6** summarizes the projections of based aircraft at F45 for the forecast scenario discussed above.

TABLE 2-6
Based Aircraft Forecast by Type of Aircraft

	Single Engine	Multi Engine	TurboProp	Jet	Rotor	Other	Total
Baseline Forecast *:							
2005 (Existing)	130	47	20	8	5	8	218
2010	146	48	21	11	6	7	239
2015	166	50	22	14	8	6	266
2020	188	51	23	19	10	5	296
2025	213	52	24	24	11	5	329

Sources:North Country Airport Aviation Activity Forecasts, October 2005; Ricondo & Associates, Inc., June 2006.
Prepared by: Ricondo & Associates, Inc., June 2006.
Notes:
* North County Airport Aviation Activity Forecasts, Ocotber 2005.

As shown, based aircraft are segregated by single engine aircraft, multi engine aircraft, turbo-propeller aircraft, jet aircraft, helicopters, and others (i.e., gliders). For this analysis, it is assumed that the based aircraft accommodated on the apron in 2005 will remain constant over the planning period, while the remainder of the based aircraft will be accommodated in hangars. Single engine aircraft, multi engine aircraft, and other types of aircraft, such as gliders, are assumed to be stored in t-hangars. Rotor aircraft are assumed to be housed in conventional hangars. Turbo-propeller aircraft and jet aircraft are assumed to be split (50 percent) between conventional and corporate hangars. Based on the above, **Table 2-7** summarizes the based aircraft considered in determining future hangar facilities at the Airport.

TABLE 2-7
Assumed Based Aircraft Stored in Hangars

	Single Engine	Multi Engine	TurboProp	Jet	Rotor	Other	Total
Baseline Forecast:							
2005 (Estimated)*	88	32	14	5	3	5	148
2010	104	33	14	7	4	5	168
2015	124	34	15	10	5	4	192
2020	146	35	16	13	7	3	220
2025	171	35	16	16	7	3	250
Type of Hangar Assumed for Based Aircraft Storage:							
	T-hangar	T-hangar	50 Percent Split Between Corporate and Conventional Hangars	50 Percent Split Between Corporate and Conventional Hangars	Conventional	T-hangar	

Sources:North Country Airport Aviation Activity Forecasts, October 2005; Ricondo & Associates, Inc., June 2006.

Prepared by: Ricondo & Associates, Inc., June 2006.

Note:

* 2005 data represents 68 percent of the total based aircraft identified for each forecast scenario that are estimated to be stored in hangars by the DOA.

Currently, the overall hangar space at the Airport totals 360,910 square feet (62 percent of this total hangar square footage are t-hangars, 20 percent are corporate hangars, 15 percent are conventional hangar, including the two new conventional hangars anticipated this year, while the remaining three percent are shade ports). Discussions with Airport staff revealed that the existing hangars are currently at capacity.

For the purpose of determining the type of future hangar facilities needed, it was necessary to identify specific planning metrics of hangar square footage per based aircraft that are representative of the facilities needed at F45. For t-hangars, a gross area of 1,500 square feet is assumed per based aircraft. This area assumes a building depth of 40 feet and a standard hangar door width of 48 feet. The area assumed for corporate hangars is based on the typical 60 feet by 60 feet corporate hangars at F45, thus 3,600 square feet. For conventional hangars, an area of 5,650 square feet per based aircraft was assumed based on a 16,000-square-foot hangar (i.e., the existing conventional hangar south of the existing FBO terminal at the Airport that includes 13,000 square feet of aircraft storage space and 3,000 square feet of office space). Based on these planning metrics, future facilities by type of hangars were identified.

Facility requirements by type of hangar for the based aircraft forecast are summarized in **Table 2-8**. T-hangars will increase by approximately 36 percent by 2025, while corporate hangars will increase by an estimated 60 percent. Conventional hangars, however, will more than double by that same timeframe. It should be noted that existing t-hangars are adequate to meet future demand levels through 2010.

2.4 Automobile Parking

Automobile parking requirements associated with the required hangar facilities were also analyzed. Using a ratio of parking area to building space, the automobile parking requirements for the Airport were determined, as summarized in **Table 2-9**. As shown, the parking requirements will increase by approximately 62 percent in 2025.

TABLE 2-8
Hangar Facility Requirements Summary

	Type of Hangars							
	T-hangars	Percent Increase	Corporate Hangars	Percent Increase	Conventional Hangars	Percent Increase	Total	Percent Increase
Baseline Forecast *:								
2005 (Existing)	231,780	-	73,330	-	55,800	-	360,910	-
2010	231,780	0.0%	78,336	6.8%	72,998	30.8%	383,114	6.2%
2015	243,720	5.2%	88,128	20.2%	84,524	51.5%	416,372	15.4%
2020	276,720	19.4%	102,816	40.2%	99,892	79.0%	479,429	32.8%
2025	315,240	36.0%	117,504	60.2%	113,339	103.1%	546,084	51.3%

Sources:North Country Airport Aviation Activity Forecasts, October 2005; Ricondo & Associates, Inc., June 2006.
Prepared by: Ricondo & Associates, Inc., June 2006.
Notes:
* North County Airport Aviation Activity Forecasts, Ocotber 2005.

TABLE 2-9
Parking Requirements Summary *

	Existing (2005)	2010	2015	2020	2025
Baseline Forecast					
Parking Area (square feet)	43,250	51,262	56,847	63,053	69,879
Percent Increase from Existing Conditions		19 percent	31 percent	46 percent	62 percent
Target Ratio:	0.13	Square foot of parking area per square foot of hangar			

Sources: North Palm Beach County General Aviation Airport Aviation Activity Forecasts, Ricondo & Associates, Inc., September 2005; Ricondo & Associates, May 2006.
Prepared by: Ricondo & Associates, Inc., June 2006.

Note:
* Only represents the parking associated with hangars.

2.5 Fueling Facilities

The demand/capacity of the Landmark Aviation fueling facilities that serve GA aircraft was evaluated. This evaluation was conducted to determine whether the facilities have the capacity to hold enough fuel to last the industry-standard recommended three days, should the fuel supply to the Airport be disrupted.

The historical segregated (45 percent Jet-A fuel vs. 55 percent AvGas) fuel flowage data for the Airport was obtained from the PBC DOA. This historical information, combined with the forecast annual operations data were used to establish a ratio of fuel demand per operation. The fuel demand was then forecast over the planning period using this ratio. The final step in this evaluation was to determine the projected fuel supply, measured in days of capacity. This was accomplished by comparing the existing fuel capacity to the

annual fuel demand, which was converted to daily fuel demand by dividing it by the number of days in a year.

To determine if there were any deficiencies in the current fueling facilities at F45, the projected fuel supply was then compared to the recommended supply of three days. **Table 2-10** summarizes the results of this evaluation.

As shown in Table 2-10, the projected fuel supply for both Jet-A fuel and AvGas far exceeds the three day recommendation. Therefore, the existing fueling facilities at F45 are, and will remain, adequate throughout the planning period.

TABLE 2-10
Fueling Facility Demand/Capacity Assessment

	Jet-A Fuel[1/]	AvGas[1/]
2005 Annual General Aviation Operations	32,199	38,651
2005 Annual Fuel Demand (gallons)	152,181	182,670 [2/]
2005 Average Fuel Demand per Operation (gallons) [3/]	5	5
2010 Annual Operations [4/]	35,639	42,780
2010 Projected Fuel Demand (gallons)	168,439	202,185
2015 Annual Operations [4/]	39,997	48,010
2015 Projected Fuel Demand (gallons)	189,033	226,905
2020 Annual Operations [4/]	44,887	53,881
2020 Projected Fuel Demand (gallons)	212,147	254,650
2025 Annual Operations [4/]	50,376	60,468
2025 Projected Fuel Demand (gallons)	238,085	285,785
Existing Fuel Capacity (gallons)	10,000	10,000
Existing Fuel Supply (2005 - days)	24	20
2010 Projected Fuel Supply (days)	22	18
2015 Projected Fuel Supply (days)	19	16
2020 Projected Fuel Supply (days)	17	14
2025 Projected Fuel Supply (days)	15	13
Recommended Fuel Supply (days) [5/]	3	3

Source: Ricondo & Associates, Inc. May 2006.
Prepared by: Ricondo & Associates, Inc. May 2006.

Notes:
[1/] Assuming that Jet-A fuel is used 45 percent of the time, and AvGas is used 55 percent of the time based on historical fuel flowage data obtained from the Palm Beach County Department of Airports.
[2/] Accounts for 32 percent touch-and-go operations.
[3/] Estimated 2005 Annual Fuel Demand based on data obtained from the Palm Beach County Department of Airports.
[4/] Reflects F45 forecast, September 2005.
[5/] Typically, a three day capacity is recommended.

2.6 Other Support Facilities

Support services at airports typically include aircraft rescue and fire fighting (ARFF), air cargo, and airport maintenance. Airport ARFF operations are mandated by the FAA, under FAR Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers,* at all U.S. airports that serve scheduled passenger air carriers.

ARFF facilities are not required at F45 because GA airports are not regulated by FAR Part 139. However, the Palm Beach County Fire Department provides any required aircraft rescue and fire fighting services at the Airport. The nearest fire station is approximately 10 miles from the Airport. No air cargo operations occur at F45, and none are planned for the foreseeable future. The Palm Beach County Department of Airports, which is located at Palm Beach International Airport, is responsible for all maintenance services at F45.

SECTION 3

Ground Access and Transportation Networks

Ground access at F45 is currently considered to be adequate. The existing road structure offers excellent regional access to F45. Over the long term, however, access to the highway will need to be improved to minimize roadway crossings.

Technical Report #4

North Palm Beach County General Aviation Airport Environmental Overview

North Palm Beach County General Aviation Airport

Prepared for

Palm Beach County Department of Airports

NOVEMBER 2006

CH2MHILL

Contents

SECTION 1

Introduction

The purpose of this chapter is to provide an overview of potential environmental impacts associated with long-term development identified in this Master Plan Update. The environmental resources evaluated include those typically considered by the National Environmental Policy Act (NEPA) and Federal Aviation Administration (FAA) Orders 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (April 2006), and 1050.1E, *Environmental Impacts: Policies and Procedures* (March 2006). **Section 2** of this chapter provides an **overview of potential impacts** to the environment that could result from the proposed projects at North Palm Beach County Airport (F45). **Section 3** provides a **summary of permits and mitigation** that may be required for construction and operation of the proposed improvements.

This qualitative impact analysis is based on current information. Prior to FAA approval for the projects recommended in this Master Plan Update, further evaluation of the impacts to identified resources will need to occur. Impacts to each of the environmental resources categories were evaluated within a **study area of one-half mile from the airport boundary** based on the North County Airport Environmental Constraints Inventory (CH2M HILL, 2005), as well as state and county websites.

SECTION 2

Environmental Impacts

2.1 Development of North Palm Beach County Airport

Development of the North Palm Beach County Airport in the early 1990s involved significant and detailed planning and environmental efforts by the Department of Airports. After years of study and assessment, securing the necessary permits took years as well, involving extensive coordination among numerous agencies including the Palm Beach County Department of Environmental Resources Management (ERM); the U.S. Army Corps of Engineers (USACOE); the Florida Department of Environmental Regulation, now the Department of Environmental Protection (DEP); and the South Florida Water Management District (SFWMD).

What emerged from these efforts was a then state-of-the-art airport constructed using the most sophisticated construction methods existent, including methods preventing sediment and construction debris from entering the surrounding wetlands and preserve habitats. In a wetlands identification and evaluation report dated June 2006, conditions in the study year 2005 were noted as follows: (CH2M HILL, 2006)

TABLE 2-1
Composition of North Palm Beach County Airport, 2005

Area	Total Acreage	Wetlands (acres)	Predominantly Uplands (acres)
Preserve Areas A – F[1]	965[2] Includes wetlands and uplands.	NA Not focus of study.	NA Not focus of study.
Developed Airport Area	359	31 Two (2) large borrow areas.	328 Includes some drainage areas.
Undeveloped Airport Area	308	90 acres of wetlands plus approx. 27 acres of potential wetlands (Areas 3 and 8).	191
Subsidiary Development Area	200	62 acres. Includes Preserve G plus an additional 127 acres of disturbed area.[3]	Approx. 11 acres of access road
Total Airport Area	1,382		

Notes:
1. Preserve Areas are as illustrated in Appendix D, Attachment K in *North County Airport – Wetland Identification and Evaluation Report*, prepared by CH2M HILL for the Palm Beach County Department of Airports and dated June 2006.
2. Acreage rounded to whole numbers throughout table.
3. Major portion of this acreage could be wetland.

2.2 Proposed Projects

The projects proposed and evaluated for impact at F45 include:

- Extension of Runway 13/31 by 1,700 feet to create a 6,000-foot runway, and widening to 100 feet to meet Airplane Design Group (ADG) C-II requirements
- Realignment of the airport entrance roadway to accommodate the Runway 13/31 extension
- Increased separation distance between Runway 13/31 and Taxiway F from 240 feet to 300 feet to accommodate the projected change in aircraft size
- Strengthening of Runway 8R/26L pavement to accommodate future projected aircraft use
- Precision markings for Runway 8R/26L
- Construction of four rows of T-hangars and one row of corporate hangars north of Taxiway C, and an access road and aircraft parking apron to serve these facilities
- Expansion of the existing apron northwest of the terminal building and construction of two corporate hangars off this apron
- Construction of up to two new access roads from Bee Line Highway

2.3 Possible Impacts

Implementation of these projects may result in impact to the environmental resource categories below. Table 2-2 summarizes all of the environmental resource categories and potential project impacts.

2.3.1 Fish, Wildlife and Plants

A number of federal and state threatened and endangered species may occur in the vicinity of the airport, including on-airport wetlands that could be impacted by the proposed projects. A wildlife and plant survey and impact assessment will need to be completed prior to FAA approval of additional development at F45. In addition, coordination with the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission is required.

Potential listed animal species include:

- American alligator (State species of special concern, Federal threatened species)
- Limpkin (State species of special concern)
- Little blue heron (State species of special concern)
- Snowy egret (State species of special concern)
- Tricolored heron (State species of special concern)
- White ibis (State species of special concern)
- Florida sandhill crane (State threatened species)
- Wood stork (State/federal endangered species)
- Snail kite (State endangered species)
- Bald eagle (State/federal threatened species)

Potential listed plant species include:

- Catesby's lily (State threatened species)
- Celestial lily (State endangered species)
- Common wild pine (State endangered species)
- Giant wild pine (State endangered species)
- Reflexed wild pine (State threatened species)
  Hand fern (State endangered species)
- Royal fern (State commercially exploited species)
- Lace-lip ladies' tresses (State threatened species)
- Snowy orchid (State threatened species)
- Butterfly orchid (State commercially exploited species)

2.3.2 Historical, Architectural, Archaeological and Cultural Resources

No known historical, architectural, archaeological or cultural resources are present in the study area. However, the Florida Division of Historical Resources (DHR) has indicated that hammocks (elevated dry upland areas) would be subject to a cultural resources assessment if disturbed. This stems from a response by the DHR to the U.S. Army Corps of Engineers in April 1991 as part of a permit application process to build the airport. At that time, Palm Beach County indicated that hammocks would be preserved and not impacted by land clearing activity for the new airport.

2.3.3 Water Quality

The Loxahatchee Slough is in the airport vicinity. This dedicated conservation area is owned by SFWMD and located across from the airport on the northeast side of Bee Line Highway. SFWMD Canal C-18 extends through a portion of the study area. The City of West Palm Beach Water Catchment Area is located to the southeast of the airport. This area provides the raw water to the metropolitan area to be processed for drinking purposes and thus is a critical resource to be protected from contamination.

A review of the US Environmental Protection Agency website indicates that Palm Beach County is located in the streamflow and recharge zones of the Biscayne sole source aquifer. Accordingly, coordination with SFWMD and the U.S. Environmental Protection Agency is required. Given the nature of the proposed development, significant and sophisticated Best Management Practices will be necessary to prevent any damage to identified resources.

2.3.4 Wetlands

A wetland identification and evaluation report was completed in June 2006 that identified wetlands on airport property based on aerial photo interpretation and a site visit (CH2M HILL, 2006). Based on the findings documented in this report, impacts to Wetland #2 would occur as a result of extending Runway 13/31 to the north, along with the extension of parallel Taxiway F. Impacts to Wetland #8 would occur as a result of new hangars at the northeast end of Runway 8L/26R. Impacts would occur to Wetland #7 as well in the realignment of the northern access road outside of the RPZ due to the extension of Runway 13/31.

All wetland impacts are subject to a formal wetland delineation and jurisdictional determination by the appropriate regulatory agencies. In this area, those agencies include the USACOE, SFWMD and Palm Beach County. These wetlands may or may not fall under the jurisdiction of some or all of these agencies**.**

TABLE 2-2
Environmental Impact Summary

Environmental Category	Resources in Study Area and Impacts Identified
Air Quality	In attainment area. Little increase in emissions foreseen.
Coastal Resources	Within state coastal zone boundary. Consistency determination required.
Compatible Land Use	Current land uses in study area are compatible. Zoning changes may be needed for development of Subsidiary Development Area (SDA).
Construction Impacts	Construction of new on-airport buildings and terminal facilities. Construction in and near wetlands and in close proximity to conservation areas. State-of-the-art construction techniques and practices must be employed to protect critical resources.
Department of Transportation Act, Section 4(f)	None anticipated
Farmlands	None present in study area
Fish, Wildlife and Plants	10 listed animal species and 10 listed plant species. Biological assessment may be required. Coordination with U.S. Fish and Wildlife Service and FL Fish and Wildlife Conservation Commission required in NEPA process.
Floodplains	Located within the limits of the 500-year floodplain (Zone B)
Hazardous Materials, Pollution Prevention and Solid Wastes	None identified
Historical, Architectural, Archeological, and Cultural Resources	Disturbance of hammock areas would require a survey (per FL DHR). Coordination with State Historic Preservation Officer (SHPO) required.
Light Emissions and Visual Impacts	None anticipated. Little development in immediate vicinity of airport.
Natural Resources and Energy Supply	None anticipated
Noise	Extension of Runway 13/31 may meet FAA definition of “major runway extension;”[1] preliminary noise analyses required to determine. If definition met, extension may trigger Environmental Assessment.
Socioeconomic Impacts, Environmental Justice, and Children’s Environmental Health and Safety Risks	None anticipated

Water Quality	Airport is surrounded by wetlands and within streamflow and recharge zones for Biscayne sole source aquifer. Coordination with the S. FL Water Management District and the U.S. Environmental Protection Agency required through the NEPA process. Given nature of proposed development and sensitivity of airport environment, Best Management Practices must be employed to prevent any damage to the identified resources, i.e., wetlands, conservation areas, preserves and so on.
Wetlands	Impacts are foreseen to Wetlands #2, #7 and #8 due to proposed project development plan. All wetland impacts are subject to a formal wetland delineation and jurisdictional determination by the appropriate regulatory agencies. In this area, those agencies include the USACOE, SFWMD and Palm Beach County. These wetlands may or may not fall under the jurisdiction of some or all of these agencies**.**
Wild and Scenic River	None present in study area

Note: 1. Definition of “major runway extension” from Federal Aviation Administration (FAA) Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (April 2006) at Para. 9l:

l. Major runway extension. A major runway extension involves at least one of the conditions mentioned in paragraphs 9.l(1) or (2) of this Order. ARP notes that removing a displaced threshold is not a runway extension.

(1) The action causes a significant adverse environmental impact to any affected environmental resource (e.g., wetland, floodplain, historic property, etc.). This, includes but is not limited to causing noise sensitive areas in the DNL 65 dB contour to experience at least a DNL 1.5 dB noise increase when compared to the no action alternative for the same time frame.3 Note that this threshold includes exposing noise sensitive land uses in the DNL 63.5 dB to DNL 65 dB noise levels or greater.

(2) Removing a relocated threshold, if an ALP indicates the removal results in a permanent, new threshold.

SECTION 3

Mitigation and Permitting

3.1 Mitigation

Mitigation for unavoidable impacts to wetlands would likely be required by USACOE, SFWMD and Palm Beach County. Probable opportunities for mitigation exist within the Subsidiary Development Area on airport property or within other nearby preserves. Mitigation may also be required by the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission for impacts to federal and state threatened and endangered species and species of special concern. Similar to mitigation for wetland impacts, these mitigation opportunities may exist on airport property or nearby preserves.

3.2 Permitting

TABLE 3-1
Required Permits/Actions for the Proposed Measures

Federal Agencies	
Federal Aviation Administration	
Approval of Airport Layout Plan (ALP)	
Review under National Environmental Policy Act (NEPA)	
U.S. Environmental Protection Agency	
Consultation regarding potential impacts to the Biscayne sole source aquifer	
U.S. Fish & Wildlife Service	
Consultation regarding potential impacts to threatened and endangered species	
U.S. Army Corps of Engineers	
Section 404 Permit	
State of Florida	
Department of Environmental Protection	
NPDES Notice of Intent	Stormwater discharge related to construction activities
Coastal Zone Program Consistency[1]	Development within the coastal zone
New Tank Construction Permit	New fuel tanks, if any, at proposed corporate hangars
Department of Transportation	
Roadway Permit	Changes, if any, made at access points on state roads

Fish & Wildlife Conservation Commission	
Consultation regarding potential impacts to threatened and endangered species	
Division of Historical Resources/ State Historic Preservation Officer	
Consultation regarding potential impacts to historically, architecturally, archeologically and culturally significant resources	
Palm Beach County	
Development Review Officer	Development review and coordination
Environmental Resource Management Department	
Vegetation Removal Permit	Removal of vegetation for multiple projects on airport property
Notice of Intent to Construct	
Building Department	
Building Permit	Construction of new hangars
Health Department	Construction of water main, force main (sewer) and gravity sewer extensions to new hangars
South Florida Water Management District	
Environmental Resource Permit	Increases in impervious surface
Coastal Zone Program Consistency[1]	Development within the coastal zone
Water Use Permit 1	Increases in operational water consumption
Water Use Permit 2	Dewatering operations during construction
Northern Palm Beach County Water Control District	
Permit	May be required for work in District right-of-way(s) or for stormwater discharges within District

Prepared by: CH2M HILL

Technical Report #5

North Palm Beach County General Aviation Airport Development Alternatives

North Palm Beach County General Aviation Airport

Prepared for

Palm Beach County Department of Airports

OCTOBER 2006

CH2MHILL
In Association with Ricondo & Associates, Inc.

Contents

SECTION 1

Overview/Summary of Facility Requirements

The previous chapter, *Demand/Capacity and Facility Requirements*, determined the facilities needed at North County General Aviation Airport (F45) based on 2025 projected aviation demand. The purpose of this chapter is to identify and recommend options that would allow F45 to meet future aviation-related demand. Before any recommended improvements can be implemented, they must be needed, justified economically and environmentally, and are subject to County, State, and Federal approvals.

A primary focus of the Master Plan is to identify and evaluate airport development alternatives that satisfy future aviation-related demand, are responsive to the needs of the communities served by the Airport, and to minimize airport costs by optimizing revenue-generating opportunities while effectively managing land uses. To satisfy these needs, various alternatives were developed. These alternatives were prepared based on the facility requirements associated with the baseline-growth forecast demand for F45 presented in the *Demand/Capacity and Facility Requirements* analysis, and include the facility needs for the 2025 time period. The screening and evaluation of the presented alternatives is also provided. The preferred facilities development alternative will serve as the basis for the future Airport Layout Plan (ALP).

1.1 Summary of Facility Requirements

This section summarizes the requirements for the airfield and general aviation (GA)/Fixed Based Operator (FBO) facilities identified in the *Demand/Capacity and Facility Requirements* chapter.

1.1.1 Airfield Facilities

A summary of the findings from the F45 *Aviation Activity Forecast* is provided in **Table 1-1**.

TABLE 1-1
Forecast Summary

	2005	2025
Based Aircraft	218	329
Annual Operations	70,850	110,844
ASV	336,934	280,912
Percent of Operations to ASV	21%	39.5%
Fleet Mix, percent jet	5%	11%

Source: CH2M HILL and Ricondo & Associates *North County Aviation Activity Forecast*, Oct. 2005, approved by the FAA in February of 2006.
Prepared by: CH2M HILL, October 2006.

Based on the forecast activity levels, the Airport's existing runway system will not experience a capacity deficiency over the planning period, as it is only projected to operate at approximately 40 percent by 2025. However, due to the expected fleet mix shift towards more light- to mid-

size business jet traffic over the planning period, as discussed in the *North County Airport Development Plan* working paper (included in **Addendum A**)[1], there are two recommended changes to the existing airfield facilities. First, the aircraft expected to regularly operate at the airport over the planning period are in the ARC C-II category, therefore it is recommended to change the ARC from B-II to C-II for at least one runway. Secondly, based on the runway length analysis for the forecast fleet mix, extending one runway to 6,000 feet is needed to better accommodate the projected design aircraft. The additional airfield facilities enhance capability and are not needed for capacity enhancement purposes, and also determined in previous planning, the proposed extension is a reasonable and economically realistic enhancement that does not duplicate facilities available within the Palm Beach system of airports.

1.1.2 GA/FBO Facilities

The GA/FBO facilities alternatives were developed for the projected space requirements for 2025. Additional facilities are required in the following areas: FBO terminal building, aircraft apron, hangars, and auto parking.

FBO Terminal Building Requirements

To meet the 2025 demand level, estimated at 11,084 square feet, 4,276 square feet of additional terminal space is needed. As tenants indicated the existing terminal building is adequate to serve existing demand, today's ratio of 0.10 square feet per annual GA aircraft operation was used to calculate the 2025 needs, as described in the previous chapter.

Aircraft Apron Requirements

To meet 2025 forecast demand levels for apron space, F45 will require 1,524,837 square feet by 2025. This equates to a 700,437 square-foot deficiency from existing space, to be considered in the airport alternatives.

Hangar Facilities

Three types of hangar facilities exist at the Airport, t-hangars/shade ports, corporate hangars, and conventional hangars. These hangars account for 360,910 square feet of hangar space on the airport. By the end of the planning horizon, the forecast indicates that hangars will need to be increased by approximately 50 percent, to 546,074 square feet.

Automobile Parking

Automobile parking requirements were established in the area associated with the hangar facilities and includes approximately 43,250 square feet. According to the baseline scenario, this area will need to be increased to a total area of 69,879 square feet, or an approximate 60 percent increase from existing conditions.

A summary of the facility requirements is provided in **Table 1-2**.

[1] CH2M HILL and Ricondo & Associates, *North County Airport Development Plan*, October 2005.

TABLE 1-2
2025 GA/FBO Facility Requirements Summary (square feet)

Facilities	Existing Facilities	2025 Requirement	Shortfall
Terminal Building/FBO	6,808	11,084	(4,276)
Aircraft Apron	824,400	1,524,837	(700,437)
Hangars			
T-Hangars	231,780	315,240	(83,460)
Corporate	73,330	117,504	(44,174)
Conventional	55,800	113,339	(57,539)
Total Hangar Facilities	360,910	546,074	(185,164)
Auto Parking[1]	43,250	69,879	(26,629)

Source: CH2M HILL and Ricondo & Associates *Demand Capacity/ Facility Requirements*, October 2006.
Prepared by: CH2M HILL, October 2006.

Notes:
1/ Only represents the automobile parking associated with hangar facilities.

1.2 Ground Access and Transportation Networks

Ground access at F45 is currently considered to be adequate and is therefore not included in the alternatives analysis.

SECTION 2

Alternatives Analysis

The previous chapter, *Demand Capacity and Facility Requirements*, identified the future requirements necessary to accommodate aviation demand for F45 over the planning period. Though airfield capacity of the existing runway system was determined adequate to accommodate aircraft operations through 2025, the need to extend one of the runways to a length of 6,000 feet has been identified. As previously discussed, this would better accommodate the aircraft operational needs of both existing and future airport users. At 4,300 feet long, Runways 8R/26L and 13/31 currently are capable of accommodating a majority of the small general aviation aircraft fleet; however, based on the findings of the runway length analysis, the existing runway length does not adequately support operations of certain types of midsize business jets.[2]

The runway alternatives were combined and evaluated with the GA/FBO Development Alternatives, as the airfield alternatives were previously evaluated and the range of options is limited due to provisions contained in the Development Order, as further described below.

2.1 Airfield Alternatives Overview

The alternatives developed to accommodate airfield needs consider several factors which guide or restrict the development of the airport, as first outlined in the *North County Development Plan* working paper. The parameters established in the Development of Regional Impact analysis and subsequent Development Order for F45 was approved on March 2, 1990, and is included for reference in **Addendum B**. [3] Key considerations for development of the airfield are the restriction on development within two major environmental preserve areas situated immediately off the east and west ends of parallel Runways 8R/26L and 8L/26R. The location of the preserves and their protection in perpetuity, in conjunction with manmade facilities east of the airport (C.S.X. railroad and SR 710), effectively preclude consideration of the extension of either parallel runway beyond its current length.[4]

Thus, the only viable alternative for addressing the need for additional runway length at F45 involves the crosswind Runway 13/31. From a wind coverage standpoint, Runway 13/31 provides crosswind coverage comparable to Runway 8R/26L, and therefore is a viable alternative for extension. However, it should be noted that before implementation of any recommended improvements at F45 occur, it is understood that any development is subject to further review by the County's Planning, Zoning and Building Administrator for a determination by the Board as to whether the change constitutes a substantial deviation as provided in Section 380.06 (19), Florida Statutes.

As previously established in the *North County Development Plan* working paper, the only feasible runway alternative is to extend Runway 13/31 to the north, maintaining the existing Runway 31 end. This alternative provides the most operationally efficient and cost-effective option, while adhering, to the maximum extent possible, to the Development Order Provisions.

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[2] Jet traffic is projected to increase from 5 percent to 11 percent of total operations, as shown in Table 1-1.

[3] Palm Beach County, *North Palm Beach County General Aviation Airport Development Order*, March 2, 1990.

[4] The impacts to the preserve areas and high relocation cost associated with relocating the railroad and the major roadway fatally flaw any alternatives proposing to extend either parallel runway (8R/26L or 8L/26R).

2.2 GA/FBO Facilities Alternatives Overview

The GA/FBO facility alternatives assess potential development at the Airport which satisfies the projected 2025 facility demand levels previously summarized for the FAA-approved baseline growth demand scenario. The analysis considers expansion needs for the FBO terminal building, aircraft apron, hangars, and auto parking.

2.3 Alternatives Description

The following alternatives were developed to meet the 2025 demand levels identified for F45 for the airfield and the GA/FBO facilities:

Alternative 1A – No Second FBO, No Airfield Improvements

Exhibit 2-1 illustrates Alternative 1A, which assumes that the existing FBO/terminal will continue to serve existing and future demand levels. As shown, additional t-hangars and corporate hangars are depicted north of the existing turf runway, while conventional hangars are accommodated in close proximity to the existing FBO/terminal building. To meet the projected requirements, the existing helipad would need to be relocated southeast of its current location to accommodate additional apron areas adjacent to the existing facilities and the proposed future conventional hangars located south of the turf runway. Due to space constraints and the need for more apron areas to meet the 2025 demand levels, additional apron space was provided west of Runway 13/31—although this is not an ideal location. This proposed apron also impacts wetlands. Lastly, no runway modifications are shown with this alternative.

Alternative 1B – No Second FBO, with Relocated Runway 13/31

Alternative 1B, presented in **Exhibit 2-2**, provides a variation of the Alternative 1A apron layout. As shown, Runway 13-31 would be relocated to the west to allow the additional apron requirements to remain in close proximity to the existing FBO/terminal building and form a contiguous area. The relocation of Runway 13/31, however, impacts significant wetland areas on Airport property.

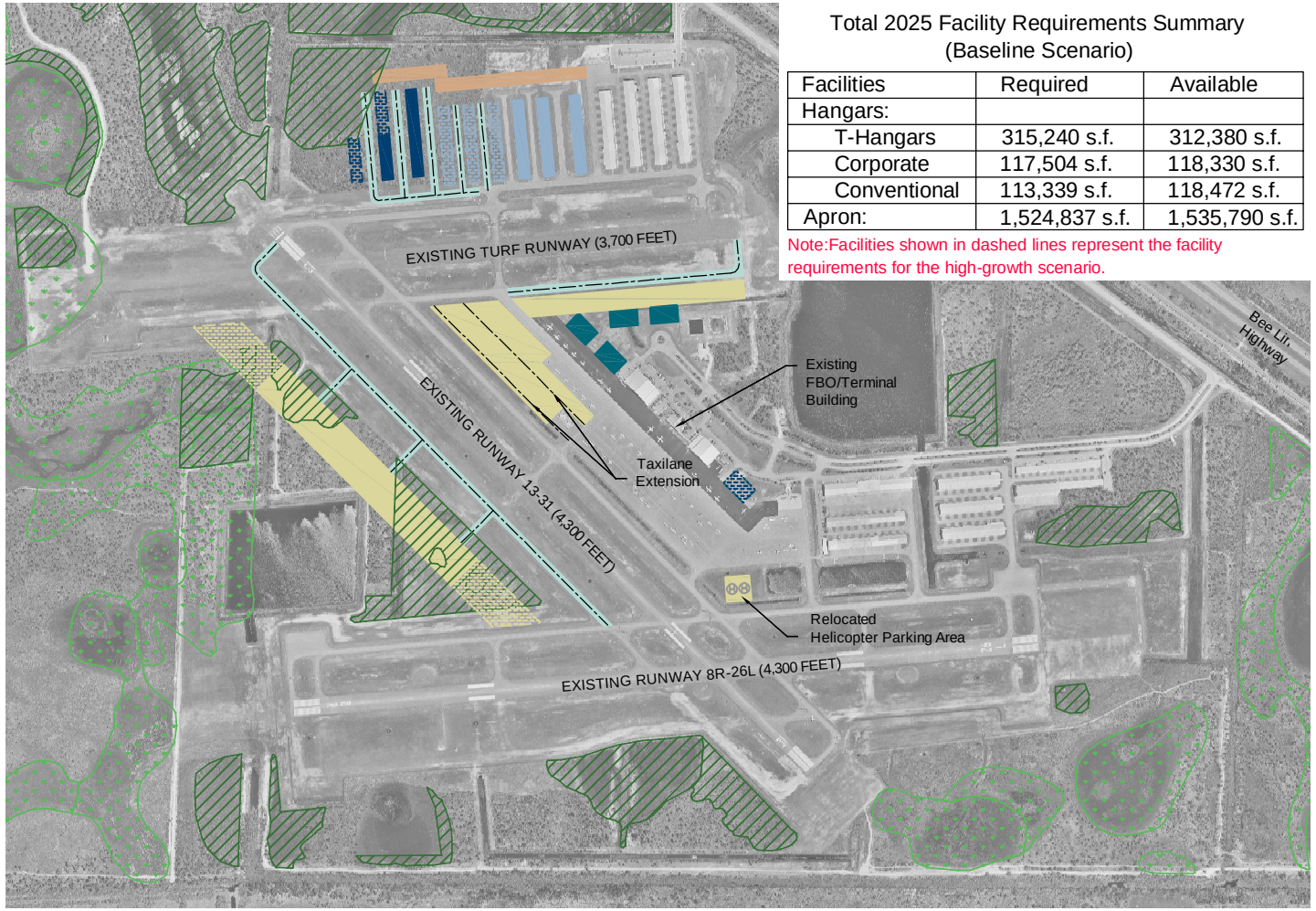
Alternative 2A – With Second FBO, North of Runway 8L/26R

Alternative 2A, illustrated in **Exhibit 2-3**, assumes a potential second FBO/terminal building at F45, as well as the recommended Runway 13/31 extension alternative of 6,000 feet. As Exhibit 2-3 illustrates, the second FBO would be located on the north side of the Airport, east of the existing t-hangars. To accommodate future facility needs, additional hangar facilities, including t-hangars and corporate hangars, are also proposed west of the new apron. As shown, some of these facilities impact wetlands. Due to space constraints on the north side of the airfield, and to minimize impacts on wetlands, most conventional hangars are proposed in the vicinity of the existing FBO/terminal building. The extended Runway 13/31 shown is a C-II runway extended to a total length of 6,000 feet to the north.

Alternative 2B – With Second FBO, West of Runway 13/31

Similarly, **Exhibit 2-4** shows the potential Alternative 2B facilities layout with the second FBO/terminal located west of 6,000-foot extended Runway 13/31. Conventional hangars are accommodated between the existing FBO/terminal building and the proposed new facility. Corporate hangar facilities are located north of the airfield or in close proximity to the new FBO/terminal building. All t-hangars are proposed on the north side of the Airport. As

Exhibit 2-4 shows, wetland areas, which were mitigated for, are impacted on the west side and north side of the airfield.



Total 2025 Facility Requirements Summary
(Baseline Scenario)

Facilities	Required	Available
Hangars:		
T-Hangars	315,240 s.f.	312,380 s.f.
Corporate	117,504 s.f.	118,330 s.f.
Conventional	113,339 s.f.	118,472 s.f.
Apron:	1,524,837 s.f.	1,535,790 s.f.

Note:Facilities shown in dashed lines represent the facility requirements for the high-growth scenario.

Legend:

- Conventional Hangars
- Corporate Hangars
- T-Hangars
- New Apron Area
- Extended Taxiway/ Taxilane
- Automobile Parking
- Wetlands (National Wetlands Inventory [Dec 1992])
- Environmental Buffer

Note:
*Area will require further analysis to ascertain development constraints

Sources: Aerial, Southern Resources and Mapping of Miami, July 2005
Ricondo & Associates, Inc., June 2006
Prepared by: Ricondo & Associates, Inc., July 2006

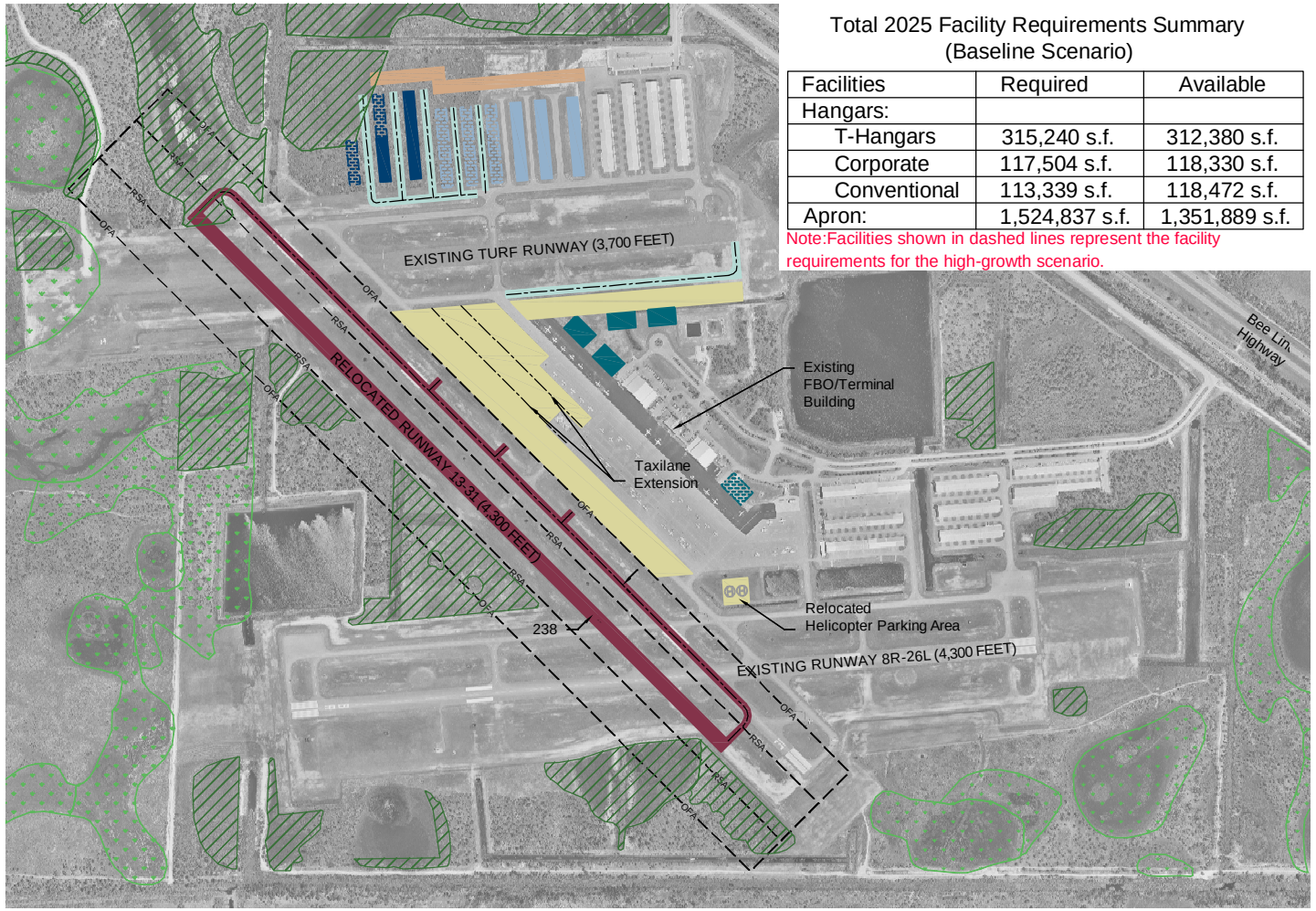
Exhibit 2-1

0 1,000 ft.

north

2025 General Aviation Facility Requirements
Alternative 1A

Drawing: P:\PBIA\System Wide Airport Master Planning Study - Phase II \Task 7 - Airport Facilities Alternatives \Task 7.3 - FBO GA and Other DF45 FBO Alternative 1A_REV2.dwg, Layout: Layout1, Jul 18, 2007, 1:41pm



Total 2025 Facility Requirements Summary
(Baseline Scenario)

Facilities	Required	Available
Hangars:		
T-Hangars	315,240 s.f.	312,380 s.f.
Corporate	117,504 s.f.	118,330 s.f.
Conventional	113,339 s.f.	118,472 s.f.
Apron:	1,524,837 s.f.	1,351,889 s.f.

Note:Facilities shown in dashed lines represent the facility requirements for the high-growth scenario.

Legend:

- Conventional Hangars
- Corporate Hangars
- T-Hangars
- New Apron Area
- Extended Taxiway/ Taxilane
- Automobile Parking
- Wetlands (National Wetlands Inventory [Dec 1992])
- Environmental Buffer*
- Relocated Runway/ Parallel Taxiway

Note:
*Area will require further analysis to ascertain development constraints

Sources: Aerial, Southern Resources and Mapping of Miami, July 2005
Ricondo & Associates, Inc., June 2006
Prepared by: Ricondo & Associates, Inc., June 2006

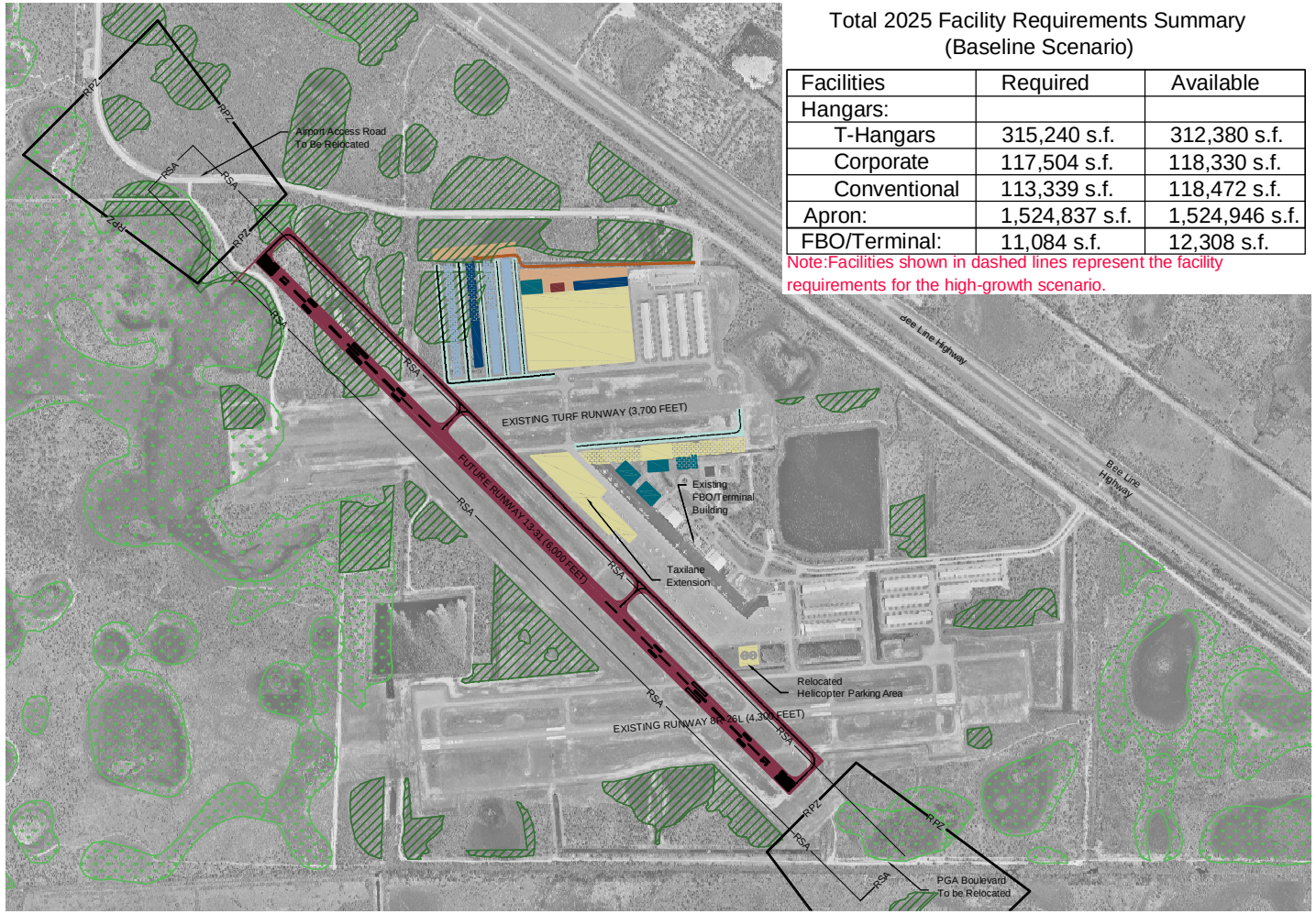
Exhibit 2-2

0 1,000 ft.

north

2025 General Aviation Facility Requirements
Alternative 1B

Drawing: P: \PBIA\System Wide Airport Master Planning Study - Phase II \Task 7 - Airport Facilities Alternatives \Task 7.3 - FBO GA and Other DF45 FBO Alternative 1B_REV2.dwg_Layout: Layout1_Jul 18, 2007, 1:37pm



Total 2025 Facility Requirements Summary
(Baseline Scenario)

Facilities	Required	Available
Hangars:		
T-Hangars	315,240 s.f.	312,380 s.f.
Corporate	117,504 s.f.	118,330 s.f.
Conventional	113,339 s.f.	118,472 s.f.
Apron:	1,524,837 s.f.	1,524,946 s.f.
FBO/Terminal:	11,084 s.f.	12,308 s.f.

Note:Facilities shown in dashed lines represent the facility requirements for the high-growth scenario.

Legend:

- Conventional Hangars
- Corporate Hangars
- T-Hangars
- FBO/Terminal Building
- New Apron Area
- Extended Taxiway/ Taxilane
- Roadway
- Automobile Parking
- Wetlands (National Wetlands Inventory [Dec 1992])
- Environmental Buffer*
- New Runway/Taxiway (Per the Airport Development Plan, October 2005)

Note:
*Area will require further analysis to ascertain development constraints

Sources: Aerial, Southern Resources and Mapping of Miami, July 2005
Ricondo & Associates, Inc., June 2006
Prepared by: Ricondo & Associates, Inc., June 2006

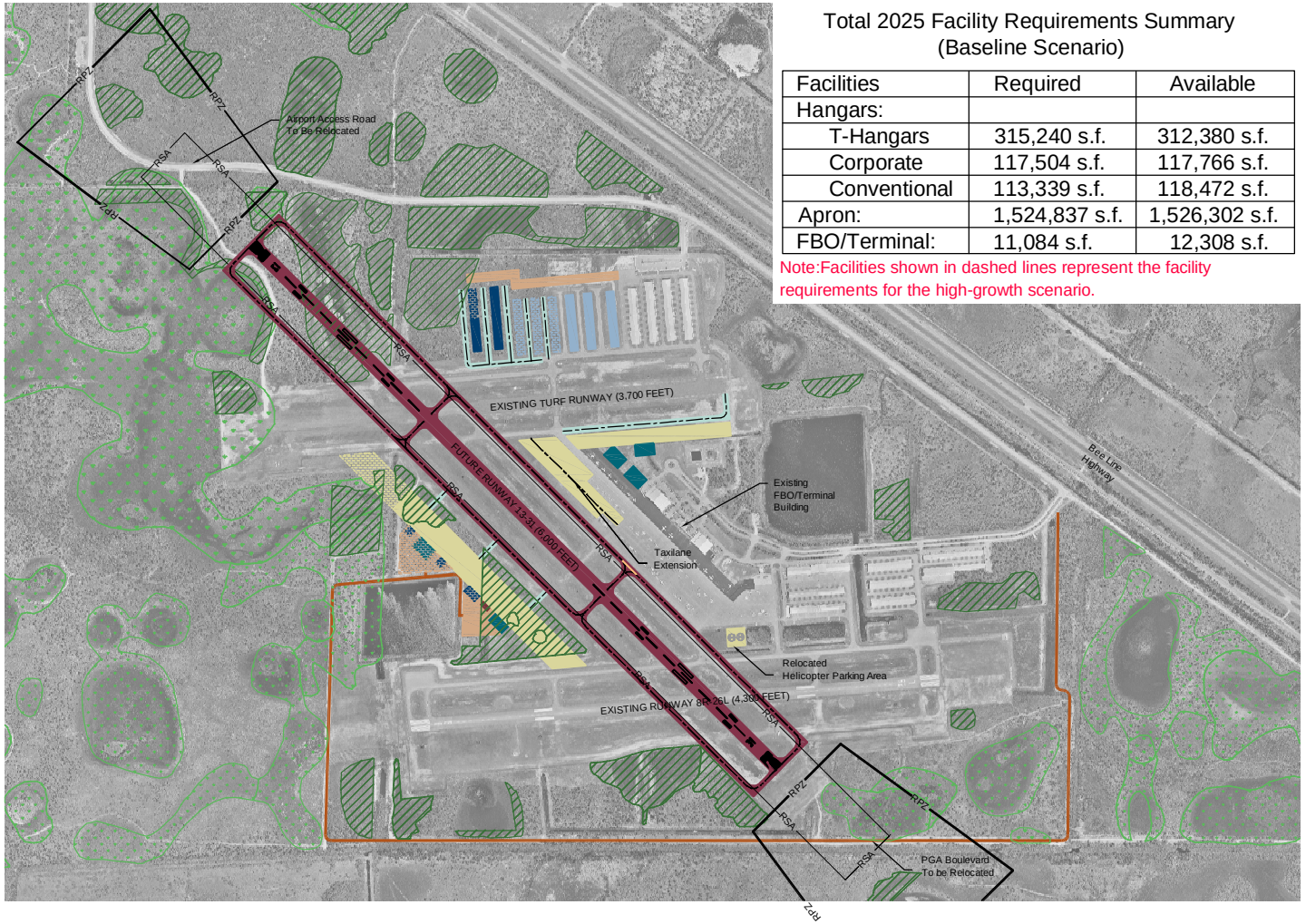
Exhibit 2-3

0 1,400 ft.

north

2025 General Aviation Facility Requirements Alternative 2A

Drawing: P: \PBIA\System Wide Airport Master Planning Study - Phase II \Task 7 - Airport Facilities Alternatives \Task 7.3 - FBO GA and Other DF45 FBO Alternative 2A_REV2.dwg, Layout: Layout1, Jul 18, 2007, 1:49pm



Total 2025 Facility Requirements Summary
(Baseline Scenario)

Facilities	Required	Available
Hangars:		
T-Hangars	315,240 s.f.	312,380 s.f.
Corporate	117,504 s.f.	117,766 s.f.
Conventional	113,339 s.f.	118,472 s.f.
Apron:	1,524,837 s.f.	1,526,302 s.f.
FBO/Terminal:	11,084 s.f.	12,308 s.f.

Note:Facilities shown in dashed lines represent the facility requirements for the high-growth scenario.

Legend:

- Conventional Hangars
- Corporate Hangars
- T-Hangars
- FBO/Terminal Building
- New Apron Area
- Extended Taxiway/ Taxilane
- Roadway
- Automobile Parking
- Wetlands (National Wetlands Inventory [Dec 1992])
- Environmental Buffer*
- Future Runway/Taxiway (Per the Airport Development Plan, October 2005)

Note:
*Area will require further analysis to ascertain development constraints

Sources: Aerial, Southern Resources and Mapping of Miami, July 2005
Ricondo & Associates, Inc., June 2006
Prepared by: Ricondo & Associates, Inc., June 2006

Exhibit 2-4

0 1,400 ft.

north

2025 General Aviation Facility Requirements
Alternative 2B

Drawing: P:\PBIA\System Wide Airport Master Planning Study - Phase II \Task 7 - Airport Facilities Alternatives \Task 7.3 - FBO GA and Other DF45 FBO Alternative 2B_with 6000' RWY 13-31_REV2.dwg, Layout: Layout1, Jul 18, 2007, 1:47pm

2.4 Evaluation Criteria

In order to compare and evaluate each of the four alternatives, five criteria were developed based on the objectives and needs of F45, including the alternatives' ability to best accommodate 2025 demand levels effectively. Those criteria are discussed below:

- *Ability to Meet the Need, Airfield Requirements* – This criterion pertains to the ability of the alternative to meet future requirements in terms of runway length, and the ability to accommodate the change for at least one runway from a B-II to a C-II.
- *Ability to Meet the Need, GA/FBO Facility Requirements* – This criterion pertains to the ability of the alternative to meet future requirements for the GA/FBO Facilities.
- *Environmental Impacts* – Much of F45 is surrounded by wetlands and environmental preserve area, as defined in the *Development Order*. This criterion will identify potential for avoidable impacts to known environmental resources. Alternatives that avoid known major environmental resources are more likely to withstand scrutiny with less significant revisions as projects advance from planning to preliminary design and detailed environmental impact assessment.
- *Operational Practicality* – This criterion evaluates the degree of "user friendliness" of the layout of facilities, and takes into consideration ground operations, and location and accessibility of support facilities and hangars.
- *Optimized Available Space* – Space availability on airport property is limited, and the ability to expand the size of the property is difficult, time consuming, and expensive. Therefore, this criterion measures the efficiency of the layout of facilities within the existing property, and measures them according to the best use of available space.

2.5 Evaluation Analysis

This section compares the four alternatives by applying the established evaluation criteria outlined above.

- *Ability to Meet the Need, Airfield Requirements* – Alternatives 1A and 1B do not provide the required 6,000-foot runway. Alternatives 2A and 2B meet this requirement equally.
- *Ability to Meet the Need, GA/FBO Facility Requirements* – Each alternative equally meets the need for hangar facilities; therefore, this criterion evaluates each alternative's ability to meet the need for the required FBO/terminal space and apron area. Alternatives 1A and 1B do not identify an area to accommodate a second FBO and therefore do not meet the need. Further, Alternative 1B does not provide adequate apron space for 2025 demand levels. Alternative 2A meets the required facility needs, as well as Alternative 2B; however, the layout in Alternative 2B is less operationally efficient.
- *Environmental Impacts* – Each of the alternatives have environmental impacts, and the preferred alternative will require further environmental analysis. Alternative 1A has the least impact to the wetlands and environmental preserve areas, though it is still impacting a large area to the west of the crosswind runway. Alternative 1B shifts the runway to the west which places portions of the OFA and RSA over wetland areas. Alternative 2A impacts areas to the northwest, primarily. Lastly, Alternative 2B produces the most environmental

impacts with the extension of the runway, addition of two taxiways, and construction of FBO facilities to the west.

- *Operational Practicality* –Alternative 1A consolidates most facilities, but provides a significant amount of the additional ramp space on the west side of Runway 13/31, which effectively isolates that area from any support functions. This precludes that additional ramp area from being fully utilized, and requires a new access road to this area. Alternative 1B provides the facilities in one consolidated area; however, it does so by shifting the crosswind runway to the west, not making the best use of the existing area. Alternative 2A provides the best layout for operational purposes given that all of the facilities are consolidated in the area northeast of Runway 13/31. Alternative 2B adds the new FBO to the west of the crosswind runway, which is less user-friendly for customers. Additionally, in order to accommodate this, a second full length parallel runway is added to the crosswind runway which is not an efficient use of space and adds substantial undue cost.
- *Optimized Available Space* – Alternative 1A splits the apron space to the east and west of the crosswind runway without providing support facilities on the west side; a poor use of the available space. Alternative 1B shifts the runway to the west to accommodate apron space; however, the shift is only necessary due to the inefficient layout of the required facilities. Alternative 2A provides all additional facilities in one area, maximizing the available space, which also enhances efficiency. Alternative 2B splits the apron space similarly to Alternative 1A, but provides FBO facilities along with it. While this Alternative is better than 1A and 1B, it does not maximize the existing airport area to the east of the crosswind runway.

Table 2-1 summarizes the evaluation and results of the alternatives analysis. The higher the score, the better the alternative; the highest score is "4" and the lowest score is "1".

TABLE 2-1
F45 Alternatives Evaluation Summary

	Alternative 1A	Alternative 1B	Alternative 2A	Alternative 2B
Ability to Meet the Need, Airfield Requirements	1	2	4	4
Ability to Meet the Need, GA/FBO Facilities	2	1	4	3
Environmental Impacts	4	2	3	1
Operational Practicality	1	3	4	2
Maximized Available Space	2	1	4	3
AVERAGE SCORES (ROUNDED)	**2**	**1**	**4**	**3**

4=best, 1=worst
Prepared by: CH2M HILL, October 2006.

Preferred Alternative

Based on the evaluation, Alternative 2A scored the highest and is therefore the preferred and recommended alternative for meeting the airfield, and GA/FBO facility development needs for F45. This alternative is similar to the preferred layout in the previous Master Plan.

Technical Report #6

Palm Beach County Airports Financial Planning

Prepared for

Palm Beach County Department of Airports

SEPTEMBER 2007

CH2MHILL
In Association with Ricondo & Associates, Inc.

Contents

1.0 Financial Analysis

The financial viability of implementing the Master Plan recommendations for the Airport and its three reliever airports collectively known as the Airport System is discussed in this chapter. As noted previously, the actual implementation schedule for the various improvements identified in the Master Plan will be defined by development triggers and demand growth rather than specific calendar years. For purposes of this illustrative financial analysis, a specific implementation schedule was assumed; however, it should be noted that this schedule and the resulting financial analysis are intended only to demonstrate financial viability and that the actual financing strategies used will be determined as implementation approaches. The projected financial results are presented in detail for the short term, Fiscal Year (FY) 2007 through FY 2017, and a more general overview is presented for the longer term of the Master Plan period, FY 2018 through FY 2025 (for Fiscal Years ending September 30). This chapter is presented in the following sections:

I. Financial Structure of the Airport
II. Capital Improvement Plan – Phasing and Funding Sources
III. Debt Service Requirements
IV. Operation and Maintenance (O&M) Expenses
V. Airport Revenues (Airline and Nonairline)
VI. Cost per Enplaned Passenger
VII. Cash Flow
VIII Debt Service Coverage
IX. Summary of Baseline Scenario
X. Sensitivity Analysis 1
XI. Sensitivity Analysis 2

2.0 Financial Structure of the Airport

This section presents a discussion of the Airport System's accounting practices, a summary of the Airport-Airline Use and Lease Agreement (the Airline Agreement) between Palm Beach County and the airlines that have executed the Airline Agreement (the Signatory Airlines), and the Bond Resolution that was adopted in 1984 and subsequently amended in full.

2.1 Accounting Practices

Airport System-related expenditures are categorized by type of expense into Direct Cost Centers and Indirect Cost Centers, as defined in the Airline Agreement. Revenues are allocated in the same manner. Direct Cost Centers include those areas or functional activities of the Airport System used for the purposes of accounting for Revenues, O&M Expenses, and Debt Service. Revenues are not usually associated with Indirect Cost Centers, which include those areas or functional activities of the Airport System used to account for O&M Expenses and Debt Service. The expenses included in Indirect Cost Centers are allocated to Direct Cost Centers as defined in the Airline Agreement.

Direct Cost Centers defined in the Airline Agreement include, but are not necessarily limited to:

- **Airside** - Includes all Debt Service, all Direct and Indirect O&M Expenses, Capital Expenditures, and Operating Revenues for the Airside. The Airside includes the landing area, taxiways and Ramp Area.
- **Terminal** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues for the Terminal, which consists of airline terminal facilities at the Airport.
- **Tenant Equipment** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues related to loading bridges, aircraft supply systems, holdroom furnishings, and certain bag makeup and bag claim equipment.
- **Ground Transportation** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues for terminal access roadways (including the enplanement/deplanement drives), all Airport roads, Airport parking facilities, and other areas and facilities accommodating ground transportation.
- **Aviation** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues for air cargo, general aviation, flight kitchen, and military activities.
- **Non-Aviation** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues for Airport areas related to non-aviation purposes that provide support functions
  (e.g., rental car maintenance areas, and miscellaneous ground areas and facilities leased by Airport tenants).
- **Terminal FIS** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues for Airport areas related to areas in the Terminal, and/or elsewhere on the Airport, to be used by agencies of the United States Government for the inspection of

passengers and their baggage, and for the exercise of the responsibilities of said agencies with respect to the movement of persons and property to and from the United States.

- **Palm Beach County Park (Lantana Airport)** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues for all activities and facilities at Lantana Airport.
- **Palm Beach County Glades Airport (Glades Airport)** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues for all activities and facilities at Glades Airport.
- **North Palm Beach County General Aviation Airport (North County Airport)** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues for all activities and facilities at North County Airport.
- **Air Cargo Building** - Includes all Debt Service, all Direct and Indirect O&M Expenses, and Operating Revenues for all activities at and facilities surrounding the Air Cargo Building.

Indirect Cost Centers defined in the Airline Agreement include, but are not necessarily limited to:

- **Administrative and Operations** - Includes all Direct O&M Expenses for all administration activities and facilities, including charges for County administrative services provided on behalf of the Airport System (e.g. accounting, finance, data processing services). Administrative O&M Expenses are allocated based on each Direct Cost Center's share of O&M Expenses attributable to all Direct Cost Centers.
- **Maintenance** - Includes all Direct O&M Expenses for maintenance activities and facilities of the Airport System. Maintenance O&M Expenses are allocated to Direct Cost Centers to the extent possible based on actual staff hours charged to each respective Direct Cost Center, and other O&M Expenses that can be directly charged.
- **Fire Department** - Includes all Direct O&M Expenses for fire, and rescue activities and facilities, including those required under FAR Part 139. Fire department O&M Expenses are allocated to Direct Cost Centers to the extent possible based on actual staff hours charged to each respective Direct Cost Center, and other O&M Expenses that can be directly charged.

2.2 Airline Agreement

The County recently negotiated a new Airline Agreement, effective October 1, 2006, with a five year term. The rate-making structure for FY 2007 through FY 2015 includes the following key elements:

- A "compensatory" average rental rate for the Terminal, using total rentable square feet as the divisor. Differential Terminal rental rates are calculated for the purpose of differentiating space by location and function.
- A "residual" landing fee rate for the Airside using total landed weight as the divisor.
- A revenue-sharing provision, by which a portion of funds remaining after the payment of debt service, O&M expenses and replenishment of required fund balances, equivalent to 50 percent, is credited to the Signatory Airline rate base in the subsequent year.

- There is no majority in interest provision in the Airline Agreement for any capital projects at the Airport**.**

2.3 Bond Resolution

The Bond Resolution authorizes the issuance of Airport System Revenue Bonds by the County. The requirements of the Bond Resolution and the methodology contained in the Airline Agreement were adhered to in developing the application of revenues included in these financial analyses. The principal funds and accounts created in the Bond Resolution are summarized below:

- Revenues (or "Operating Revenues") as defined in the Bond Resolution, include, generally, all revenue due and payable to the County from the ownership or operation of the Airport System, including all rentals, concession revenue, use charges, and landing fees.
- An O&M Reserve requirement was established in an amount equal to one-sixth of the amount appropriated in the annual budget for O&M Expenses for the then-current Fiscal Year.
- Pursuant to the Bond Resolution, the County covenants that it will fix, charge, and collect rates, fees, rentals, and charges for the use of the Airport System, and shall revise such rates, fees, rentals, and charges as often as may be necessary or appropriate to produce Revenues in each Fiscal Year at least equal to the sum of Operation and Maintenance Expenses, including reserves therefore provided for in the annual budget, plus the greater of (a) an amount equal to the sum of 1.25 times the Aggregate Debt Service for such Fiscal Year, or (b) the sum of (i) the amount to be paid during such Fiscal Year into the Debt Service Account, plus (ii) the amount, if any, to be paid during the Fiscal Year into the Debt Service Reserve Account (including amounts payable to the issuer of any Debt Service Reserve Account Facility and excluding amounts required to be paid into such account out of the proceeds of Bonds), plus (iii) the amount, if any, to be paid into the Renewal and Replacement Fund as provided in the Annual Budget, plus (iv) all other charges and liens whatsoever payable out of Revenues during such Fiscal Year, plus (v) to the extent not otherwise provided for, all amounts payable on Subordinated Indebtedness.

3.0 Capital Improvement Plan – Phasing and Funding Sources

This section presents a discussion of the Master Plan's long-term Capital Improvement Plan (CIP) including discussion of major projects and funding sources.

3.1 Projects

Funding for the CIP is expected to be secured from various sources. The estimated capital costs were developed in current dollars and escalated to inflated dollars using an annual growth rate of five percent. **Table 1.1** presents the CIP by Airport by funding source. The CIP is estimated to cost $922.1 million in inflated dollars, and consists of the following projects:

- Airside projects in the CIP are estimated to total approximately $390.2 million.
- Terminal improvements are estimated to total $75 million and include redevelopment of Concourse A, expansion of Concourse C, and construction of a new baggage system.
- A new parking garage for the Airport is planned for FY 2023 at an estimated cost of $224 million.
- A cargo facility is planned for FY 2015 at an estimated cost of $33 million.
- Projects at the general aviation airports are planned as follows:
  - Lantana Airport - $23 million
  - North County Airport - $26 million
  - Glades Airport – $5 million

3.2 Funding Sources

The County intends to finance the recommended CIP through a combination of FAA Airport Improvement Program (AIP) grants (entitlements and discretionary), Florida Department of Transportation (FDOT) grants, passenger facility charge (PFC) revenues, County funds, and proceeds from the sale of General Airport Revenue Bonds (GARBs). The County has been actively seeking maximum discretionary funding for certain Airfield projects and may pursue an FAA Letter of Intent (LOI) for certain Airfield projects. **Table 1.2** presents the CIP for FY 2007 through FY 2025 and funding sources for each project. For purposes of this report, funding sources have been identified on the basis of project eligibility and are presented as a Base Case. Actual funding may not be secured at this level of eligibility and alternative funding scenarios are presented later in the chapter. The following sections briefly describe the anticipated funding sources for these projects.

Table 1.1 (1 of 2)

Capital Improvement Plan – Summary of Funding Sources

Project	Total Project Escalated Dollars	Funding Source: AIP Ent & Disc	FDOT	PFC	Airport Cash	GARBs
PALM BEACH INTERNATIONAL AIRPORT						
Expand and Rehab Overnight Parking Apron	$740,000	$0	$370,000	$370,000	$0	$0
Apron "A" Expansion	3,420,000	0	1,220,000	2,200,000	0	0
NAVAID Relocation Study	300,000	0	0	300,000	0	0
Construct Maintenance Compound	1,000,000	0	0	1,000,000	0	0
Rehabilitate Aircraft Parking Apron	1,090,000	0	545,000	545,000	0	0
Extension of Taxiway "F" to RW 13	13,400,000	0	5,236,500	8,163,500	0	0
Extend Runway 9R-27L Environmental & Design	8,284,000	0	4,142,000	4,142,000	0	0
Extension of Taxiway "L" (Lima)	17,700,000	0	8,850,000	8,850,000	0	0
Miscellaneous taxiway rehab	5,250,000	0	2,625,000	2,625,000	0	0
New Taxiway Connector - Runway 9L-27R	5,300,000	3,975,000	662,500	662,500	0	0
Taxiway Romeo West of R1 & East of R1	20,825,398	15,619,049	2,603,175	2,603,175	0	0
Taxiway C4 High Speed Exit - Rwy 9L-27R	5,084,000	4,067,200	508,400	508,400	0	0
Taxiway D High Speed Exit - Rwy 9L-27R	4,721,000	3,776,800	472,100	472,100	0	0
Replace (2) Fire Rescue Vehicles	2,250,000	0	1,000,000	1,250,000	0	0
Concourse "A" Redevelopment	20,375,000	0	2,075,000	18,300,000	0	0
Acquire land runway 9L-27R	7,094,817	3,000,000	375,000	3,719,817	0	0
Taxiway Lima (West) Upgrades and Improvements	17,048,000	12,786,000	2,131,000	2,131,000	0	0
Runway 9R Property Acquisition	35,846,700	24,802,632	4,272,034	6,772,034	0	0
Golfview Apron, Taxilanes/Taxiways and Infrastructure	74,000,000	55,500,000	0	18,500,000	0	0
Golfview Facilities	130,000,000	97,500,000	0	32,500,000	0	0
Relocate VOR	3,939,281	2,954,461	492,410	492,410	0	0
Taxiway Charlie (East) Improvements	7,800,000	0	7,020,000	780,000	0	0
Extend, Relocate and Upgrade RWY 9R-27L	77,101,000	43,039,000	17,031,000	17,031,000	0	0
Construct Apron Golfview 2	6,000,000	4,500,000	750,000	750,000	0	0
Construct Surface Parking Lot	1,426,946	0	0	0	1,426,946	0
Demolition East of Runway 13-31	17,600,000	13,200,000	2,200,000	2,200,000	0	0
Demolition West of Runway 13-31	10,600,000	7,950,000	1,325,000	1,325,000	0	0
Runway 13-31 Pavement Removal	2,500,000	1,875,000	312,500	312,500	0	0
Runway 13-31, Taxiway F and Taxiway B Extensions and Taxiway Connectors	23,000,000	17,250,000	2,875,000	2,875,000	0	0
Part 150 Study PBIA	800,000	720,000	40,000	40,000	0	0
Rehabilitate Taxiway C	8,500,000	3,609,000	2,445,500	2,445,500	0	0
New Parking Revenue Center	2,609,546	0	0	0	2,609,546	0
New Cargo Apron	5,461,307	4,915,177	273,065	273,065	0	0
Concourse "B" Expansion	29,500,000	2,000,000	3,582,157	18,917,843	5,000,000	0
Miscellaneous Taxiway Rehab	2,687,834	1,707,500	490,167	490,167	0	0
New Belly Cargo/All Cargo Facility	33,131,938	0	0	33,131,938	0	0
Cargo Apron Expansion	3,070,758	2,763,682	153,538	153,538	0	0
Construct Surface Parking Lot	4,270,962	0	3,416,770	854,192	0	0
Terminal Building Baggage System Expansion	24,979,506	0	0	24,979,506	0	0
Construct Surface Parking Lot	5,806,149	0	0	0	5,806,149	0
New Parking Garage	224,176,582	0	0	0	0	224,176,582
Subtotal Palm Beach International Airport	$868,690,724	$327,510,501	$79,494,816	$222,666,185	$14,842,641	$224,176,582

Table 1.1 (2 of 2)
Capital Improvement Plan – Summary of Funding Sources

Project	Total Project Escalated Dollars	Funding Source: AIP Ent & Disc	FDOT	PFC	Airport Cash	GARBs
LANTANA						
Runway 33 Threshold Improvements	$150,000	$142,500	$3,750	$3,750	$0	$0
Construct Hangars at Lantana	1,875,000	0	1,500,000	0	375,000	0
Construct Hangars (Rows 500, 600 & 700)	5,000,000	0	4,000,000	0	1,000,000	0
Upgrade Airfield Signage	400,000	380,000	10,000	10,000	0	0
Expand Itinerant Apron	6,200,000	0	4,960,000	1,240,000	0	0
Relocate Airport Rotating Beacon	100,000	95,000	0	5,000	0	0
Taxiway C Rehab	1,100,000	0	880,000	220,000	0	0
Apron Rehab	275,000	0	220,000	55,000	0	0
Rehab Runway 15/33	1,500,000	0	1,200,000	300,000	0	0
Rehab Runway 3/21	200,000	0	160,000	40,000	0	0
Construct Apron	2,200,000	0	1,760,000	440,000	0	0
Construct Hangars (Rows 1600, 1700, 1800 & 1900)	3,600,000	0	2,880,000	0	720,000	0
Construct Access Road to West Side Development	250,000	0	200,000	50,000	0	0
Subtotal Lantana	$22,850,000	$617,500	$17,773,750	$2,363,750	$2,095,000	$0
NORTH COUNTY AIRPORT						
Miscellaneous Pavement Rehab	$250,000	$237,500	$6,250	$6,250	$0	$0
Construct Hangars at North County	1,875,000	0	1,500,000	0	375,000	0
Construct Apron and Taxilanes	1,875,000	0	1,500,000	375,000	0	0
Construct Service Road from Terminal to North T-Hangars	550,000	0	440,000	110,000	0	0
Construct Additional Tie-Down/Transient Apron	4,200,000	0	3,360,000	840,000	0	0
Construct Hangars	5,000,000	0	4,000,000	0	1,000,000	0
Hangar Construction Environmental Mitigation	2,500,000	0	2,000,000	500,000	0	0
Construct Parallel Runway	4,450,000	4,227,500	111,250	111,250	0	0
Environmental Mitigation Runway 13-31	5,000,000	0	4,000,000	1,000,000	0	0
Subtotal North County Airport	$25,700,000	$4,465,000	$16,917,500	$2,942,500	$1,375,000	$0
GLADES						
T-Hangar Taxilane Rehab	$143,000	$135,850	$3,575	$3,575	$0	$0
Construct T-Hangar Facilities	500,000	0	400,000	0	100,000	0
Runway 17/35 Crack Sealing	80,000	76,000	0	4,000	0	0
Construct T-Hangars	1,250,000	0	1,000,000	0	250,000	0
Install PAPIs and REILs	360,000	342,000	0	18,000	0	0
Expand Aircraft Parking Apron	1,500,000	0	1,200,000	300,000	0	0
Property Acquisition	1,000,000	0	800,000	200,000	0	0
Subtotal Glades	$4,833,000	$553,850	$3,403,575	$525,575	$350,000	$0
TOTAL	$922,073,724	$333,146,851	$117,589,641	$228,498,010	$18,662,641	$224,176,582
Total Funding Sources By Cost Center:						
Airside	$390,164,095	$228,010,501	$69,420,889	$92,732,706	$0	$0
Terminal	74,854,506	2,000,000	5,657,157	62,197,349	5,000,000	0
Ground Transportation	238,290,185	0	3,416,770	854,192	9,842,641	224,176,582
Aviation	130,000,000	97,500,000	0	32,500,000	0	0
Lantana	22,850,000	617,500	17,773,750	2,363,750	2,095,000	0
Glades	4,833,000	553,850	3,403,575	525,575	350,000	0
North County Airport	25,700,000	4,465,000	16,917,500	2,942,500	1,375,000	0
Air Cargo Building	33,131,938	0	0	33,131,938	0	0
Fire Rescue	2,250,000	0	1,000,000	1,250,000	0	0
TOTAL	$922,073,724	$333,146,851	$117,589,641	$228,498,010	$18,662,641	$224,176,582

Source: Palm Beach County
Prepared by: Ricondo & Associates, Inc.

Table 1.2 (1 of 2)

Capital Improvement Plan – Total Project Costs by Year

Project	Total Project Escalated Dollars	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
PALM BEACH INTERNATIONAL AIRPORT																				
Expand and Rehab Overnight Parking Apron	$740,000	$740,000																		
Apron "A" Expansion	$3,420,000	$3,420,000																		
NAVAID Relocation Study	$300,000	$300,000																		
Construct Maintenance Compound	$1,000,000		$1,000,000																	
Rehabilitate Aircraft Parking Apron	$1,090,000		$1,090,000																	
Extension of Taxiway "F" to RW 13	$13,400,000		$776,000	$12,624,000																
Extend Runway 9R-27L Environmental & Design	$8,284,000		$3,000,000	$5,284,000																
Extension of Taxiway "L" (Lima)	$17,700,000		$1,717,000	$15,983,000																
Miscellaneous taxiway rehab	$5,250,000		$5,250,000																	
New Taxiway Connector - Runway 9L-27R	$5,300,000		$5,300,000																	
Taxiway Romeo West of R1 & East of R1	$20,825,398		$6,700,000				$2,825,080	$8,475,239	$2,825,080											
Taxiway C4 High Speed Exit - Rwy 9L-27R	$5,084,000		$5,084,000																	
Taxiway D High Speed Exit - Rwy 9L-27R	$4,721,000		$4,721,000																	
Replace (2) Fire Rescue Vehicles	$2,250,000			$2,250,000																
Concourse "A" Redevelopment	$20,375,000			$20,375,000																
Acquire land runway 9L-27R	$7,094,817			$7,094,817																
Taxiway Lima (West) Upgrades and Improvements	$17,048,000			$17,048,000																
Runway 9R Property Acquisition	$35,846,700			$25,846,700	$10,000,000															
Golfview Apron, Taxilanes/Taxiways and Infrastructure	$74,000,000			$74,000,000																
Golfview Facilities	$130,000,000			$130,000,000																
Relocate VOR	$3,939,281			$3,939,281																
Taxiway Charlie (East) Improvements	$7,800,000			$7,800,000																
Extend, Relocate and Upgrade RWY 9R-27L	$77,101,000				$27,545,150	$49,555,850														
Construct Apron Golfview 2	$6,000,000				$6,000,000															
Construct Surface Parking Lot	$1,426,946				$1,426,946															
Demolition East of Runway 13-31	$17,600,000					$17,600,000														
Demolition West of Runway 13-31	$10,600,000					$10,600,000														
Runway 13-31 Pavement Removal	$2,500,000						$2,500,000													
Runway 13-31, Taxiway F and Taxiway B Extensions and Taxiway Connectors	$23,000,000						$23,000,000													
Part 150 Study PBIA	$800,000							$800,000												
Rehabilitate Taxiway C	$8,500,000							$8,500,000												
New Parking Revenue Center	$2,609,546								$2,609,546											
New Cargo Apron	$5,461,307								$5,461,307											
Concourse "B" Expansion	$29,500,000									$29,500,000										
Miscellaneous Taxiway Rehab	$2,687,834									$2,687,834										
New Belly Cargo/All Cargo Facility	$33,131,938									$33,131,938										
Cargo Apron Expansion	$3,070,758										$3,070,758									
Construct Surface Parking Lot	$4,270,962										$4,270,962									
Terminal Building Baggage System Expansion	$24,979,506											$24,979,506								
Construct Surface Parking Lot	$5,806,149														$5,806,149					
New Parking Garage	$224,176,582																	$224,176,582		

Table 1.2 (2 of 2)

Capital Improvement Plan – Total Project Costs by Year

Project	Total Project Escalated Dollars	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
LANTANA																				
Runway 33 Threshold Improvements	$150,000	$150,000																		
Construct Hangars at Lantana	$1,875,000		$1,875,000																	
Construct Hangars (Rows 500, 600 & 700)	$5,000,000			$5,000,000																
Upgrade Airfield Signage	$400,000			$400,000																
Expand Itinerant Apron	$6,200,000			$6,200,000																
Relocate Airport Rotating Beacon	$100,000				$100,000															
Taxiway C Rehab	$1,100,000				$1,100,000															
Apron Rehab	$275,000				$275,000															
Rehab Runway 15/33	$1,500,000				$1,500,000															
Rehab Runway 3/21	$200,000				$200,000															
Construct Apron	$2,200,000						$2,200,000													
Construct Hangars (Rows 1600, 1700, 1800 & 1900)	$3,600,000						$3,600,000													
Construct Access Road to West SIde Development	$250,000									$250,000										
NORTH COUNTY AIRPORT																				
Miscellaneous Pavement Rehab	$250,000	$250,000																		
Construct Hangars at North County	$1,875,000		$1,875,000																	
Construct Apron and Taxilanes	$1,875,000			$1,875,000																
Construct Service Road from Terminal to North T-Hangars	$550,000			$550,000																
Construct Additional Tie-Down/Transient Apron	$4,200,000			$4,200,000																
Construct Hangars	$5,000,000				$5,000,000															
Hangar Construction Environmental Mitigation	$2,500,000				$2,500,000															
Construct Parallel Runway	$4,450,000					$4,450,000														
Environmental Mitigation Runway 13-31	$5,000,000														$5,000,000					
GLADES																				
T-Hangar Taxilane Rehab	$143,000	$143,000																		
Construct T-Hangar Facilities	$500,000	$500,000																		
Runway 17/35 Crack Sealing	$80,000		$80,000																	
Construct T-Hangars	$1,250,000			$625,000	$625,000															
Install PAPIs and REILs	$360,000			$360,000																
Expand Aircraft Parking Apron	$1,500,000				$1,500,000															
Property Acquisition	$1,000,000							$1,000,000												
TOTAL	$922,073,724	$5,503,000	$38,468,000	$341,454,798	$57,772,096	$82,205,850	$34,125,080	$18,775,239	$10,895,933	$65,569,772	$7,341,720	$24,979,506	$0	$0	$10,806,149	$0	$0	$224,176,582	$0	$0
Total Project Costs By Cost Center:																				
Airside	$390,164,095	$4,460,000	$34,638,000	$169,619,798	$43,545,150	$77,755,850	$28,325,080	$17,775,239	$8,286,387	$2,687,834	$3,070,758	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal	74,854,506	0	0	20,375,000	0	0	0	0	0	29,500,000	0	24,979,506	0	0	0	0	0	0	0	0
Ground Transportation	238,290,185	0	0	0	1,426,946	0	0	0	2,609,546	0	4,270,962	0	0	0	5,806,149	0	0	224,176,582	0	0
Aviation	130,000,000	0	0	130,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lantana	22,850,000	150,000	1,875,000	11,600,000	3,175,000	0	5,800,000	0	0	250,000	0	0	0	0	0	0	0	0	0	0
Glades	4,833,000	643,000	80,000	985,000	2,125,000	0	0	1,000,000	0	0	0	0	0	0	0	0	0	0	0	0
North County Airport	25,700,000	250,000	1,875,000	6,625,000	7,500,000	4,450,000	0	0	0	0	0	0	0	0	5,000,000	0	0	0	0	0
Air Cargo Building	33,131,938	0	0	0	0	0	0	0	0	33,131,938	0	0	0	0	0	0	0	0	0	0
Fire Rescue	2,250,000	0	0	2,250,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	$922,073,724	$5,503,000	$38,468,000	$341,454,798	$57,772,096	$82,205,850	$34,125,080	$18,775,239	$10,895,933	$65,569,772	$7,341,720	$24,979,506	$0	$0	$10,806,149	$0	$0	$224,176,582	$0	$0

Source: Palm Beach County
Prepared by: Ricondo & Associates, Inc.

3.2.1 AIP Grants

One of the main sources of funding for airport improvements is the federal AIP. The AIP was initially authorized by the Airport and Airway Improvement Act of 1982 to assist airport sponsors in funding planning, development, and noise compatibility projects at public-use airports nationwide to accommodate projected civil aviation growth. To be eligible for funding assistance under this 1982 act, an airport must be included in the National Plan of Integrated Airport Systems (NPIAS).

The AIP is funded through the Aviation Trust Fund, which was established by the Airport and Airway Revenue Act of 1970. Revenues for the Aviation Trust Fund are derived through the levying of taxes and fees on aviation fuel and lubricants, airline tickets, international departing passengers, aircraft freight, and other components of the aviation industry. Funds deposited into the Aviation Trust Fund are distributed to eligible airports throughout the United States and its territories through grants administrated by the FAA under appropriations limits established by the United States Congress.

The FAA allocates funds to the nation's airports based on a number of eligibility criteria tied to a priority system used to rank each request and determine which projects will be funded and which will not during any given federal fiscal year (also ending September 30). The priority system used by the FAA is based on different criteria for different types of projects. Generally, projects that enhance the safety of aircraft operations and those that enhance capacity in the national air transportation system are higher priority projects. Projects are also ranked based on the size of the airport and the number of aircraft and aircraft operations at the facility.

The County has assumed that approximately $333.1 million of projects are eligible for AIP funding (discretionary and entitlements), including the extension and relocation of Runway 9R-27L at Palm Beach International Airport. The County intends to pursue an LOI for the airfield projects that comprise the Airfield Improvement Projects. As the runway and other airfield improvements will significantly enhance the capacity of the national air transportation system, the runway and associated airfield projects are ideally suited for LOI funding. The proposed runway project is expected to be economically justifiable with a positive net present value and a benefit-cost ratio significantly greater than 1.

3.2.2 FDOT Funds

Similar to the federal AIP, the FDOT Aviation Grant Program is funded from the State Transportation Trust Fund. The State Transportation Trust Fund consists, in part, of funds collected through the State's aviation fuel tax. The FDOT Aviation Office administers the aviation grant program to help provide a safe, cost-effective, and efficient Statewide aviation system. The FDOT Aviation Grant Program supplements the AIP, providing a portion of the sponsor's matching share when federal funding is available and up to 80 percent of the overall project cost when it is not. FDOT grant funds help airport sponsors to construct T-hangars, construct and maintain runways and taxiways, eliminate airport hazards, protect the airspace, and construct terminals and other facilities.

All publicly owned Florida airports that are open for public use are eligible for State funding. In addition, privately owned airports that are classified as "reliever" airports are eligible for FAA funding. Florida law generally allows FDOT to fund any capital project on airport property and any service that leads to capital projects, such as planning and design services. The only off-airport projects eligible for FDOT funding are the purchase of lands for mitigation purposes, the

purchase of avigation easements, and the access projects for intercontinental airports. Airport capital equipment is eligible, except equipment closely related to day-to-day operations (mowing machines, weed eaters, airport vehicles, etc.). In general, operational expenses, such as for maintenance services, equipment, and supplies, are not eligible for FDOT aviation grants. To be eligible for FDOT grants, each airport project must be consistent with the airport's role as defined in the Florida Aviation System Plan (FASP), and capital projects must be part of an FDOT approved airport master plan or airport layout plan. Additionally, for projects to be eligible for State funding, they must also be included in the Joint Automated Capital Improvement Plan (JACIP). Under this plan, the State accepts requests from airport sponsors for project funding along with each airport sponsor's priority for individual airport projects. Inclusion in the JACIP does not represent a commitment by the FDOT or FAA to fund a particular project or projects. The JACIP is intended to coordinate State and federal funding efforts and provide a realistic approach to funding based on the best and most current information available regarding projects at Florida grant-eligible airports.

FDOT grants are expected to fund approximately $117.6 million of the Master Plan projects.

3.2.3 Passenger Facility Charge Revenues

In accordance with the Aviation Safety and Capacity Expansion Act of 1990, as amended by the Aviation Investment and Reform Act for the 21st Century (AIR-21), the County recently filed a PFC application to impose a $4.50 PFC at the Airport. PFC revenues may be used to fund the local share of eligible Airport project costs (PFC eligibility for projects generally follows the same general guidelines for determining AIP grant eligibility outlined earlier).

In June 2007, the County filed a PFC Application to collect PFC at a $4.50 level, which is expected to be approved and will become effective May 1, 2008. The County is therefore, required by AIR-21 to demonstrate to the FAA that the project will make a significant contribution to improving air safety and security, increasing competition among air carriers, reducing current or anticipated congestion, or reducing the impact of aviation noise on people living near the Airport. The finding of significant contribution is in addition to the finding of adequate justification already required for all PFC-eligible projects. In particular, the FAA considers all relevant factors, including but not limited to the following, in assessing whether the significant contribution requirement has been met:

- *Safety and security projects.* Does the project advance airport safety and/or security? In the case of AIP discretionary funds, highest priority is usually given to those projects that meet regulatory requirements for safety and security under 14 CFR Part 139 and Part 107, respectively. A similar approach to assessing PFC significance may be appropriate.
- *Congestion (capacity).* Does the project support or is it part of a capacity project to which the FAA has allocated federal resources or that would qualify for such resources? For example, is the project included in an LOI or does it satisfy the FAA's benefit-cost criteria for large AIP discretionary investments? Has the project been identified as an important item in an FAA Airport Capacity Enhancement Plan? Does the project alleviate an important constraint on airport growth or service?
- *Noise.* Does the project affect the noise-impacted areas around the airport? Historically, higher priority for AIP discretionary grants has been given to projects in noisier areas over projects in less noisy areas, all other factors being equal. A similar approach to assessing PFC significance may be appropriate.

- *Competition.* Does the project mitigate or remove barriers to increased airline competition at the airport? Has the project been identified as an essential component in the airport's competition plan or other similar documents?

When submitting PFC applications for projects identified as being partially funded with PFC revenues, the County will need to provide sufficient information to support its assertion that a project makes a significant contribution to one or more of the above factors. In the case of a project that would reduce congestion, the information may include a quantified measure of reduced delay per aircraft operation or reference a study that included measures of the expected congestion reduction benefits. Similarly, an assertion that a project enhances competition may be supported by information on the number of new operations that the project would provide for, the number of new entrant airlines it would accommodate, the effect on fares at the airport, and/or other measures of increased competition. In general, because "significant contribution" is a higher standard than adequate justification, more documentation is required to establish significant contribution than is typically needed for adequate justification.

The annual cost of projects identified as PFC-eligible exceeds the PFC capacity in the years in which the project costs are expected to be incurred. Thus, it is anticipated that the County may issue PFC-backed bonds to fund certain projects and that a portion of annual PFC collections will be used to pay the outstanding debt service on any PFC-backed bonds.

Master Plan projects totaling $228.5 million are expected to be funded from PFC revenues. Of this amount, approximately $43.4 million is anticipated to be funded on a pay-as-you-go basis and the remaining $185.1 million is expected to be funded with bond proceeds that will subsequently be repaid with PFC revenues. **Table 1.3** presents projections of PFC revenues and PFC expenditures and reflects that ample PFC capacity exists to fund those Airport System projects identified as PFC-eligible.

Funding assumptions incorporated into the calculation of annual debt service resulting from the issuance of the bonds include the following:

- Three debt series - Series 2009 is to include a portion of the projects expected to be undertaken in FY 2009 through FY 2011; Series 2015 is to include all projects expected to be undertaken in FY 2015; and Series 2017 is to include all projects expected to be undertaken in FY 2017.
- 30-year term
- No capitalized interest
- 6.5 percent interest rate
- Establishment of a Debt Service Reserve Account equivalent to the maximum annual debt service
- Level annual debt service

3.2.4 Airport Funds

Under the County's existing Bond Resolution and the Airline Agreement, an Improvement and Development Fund is established that can be used for Airport System capital projects at the County's sole discretion. The Improvement and Development Fund is funded from any remaining Airport System earnings after the payment of O&M Expenses, the payment of

Table 1.3

Projection of PFC Revenue

Fiscal Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Enplanements [1]	3,723,800	3,842,600	3,979,500	4,138,700	4,264,600	4,394,900	4,529,900	4,669,700	4,814,700	4,958,600	5,107,400	5,261,400	5,420,700	5,585,600	5,748,100	5,916,900	6,092,300	6,274,500	6,463,900
PFC per passenger	$4.50	$4.50	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00
Admin.	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11
% eligible	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
PFC Revenues	14,712,734	15,182,113	21,095,330	21,939,249	22,606,645	23,297,365	24,013,000	24,754,080	25,522,725	26,285,539	27,074,327	27,890,681	28,735,131	29,609,266	30,470,678	31,365,487	32,295,282	33,261,125	34,265,134
Investment Earnings	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Net PFC Revenues Capacity	$14,970,207	$15,447,800	$21,464,498	$22,323,186	$23,002,261	$23,705,069	$24,433,227	$25,187,276	$25,969,372	$26,745,536	$27,548,128	$28,378,768	$29,237,995	$30,127,428	$31,003,915	$31,914,383	$32,860,450	$33,843,194	$34,864,774
Pay-As-You-Go (FY 2007 - FY 2025)	2,883,575	11,442,000	20,365,500	7,991,500				11,273,065	2,237,834	1,007,730		0	0	1,000,000	0	0	0	0	0
Future PFC Debt Service – Series 2009 (FY '09-'10 Projects)				4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709	4,604,709
Future PFC Debt Service – Series 2011 (FY '11-12 projects)						14,010,097	14,010,097	14,010,097	14,010,097	14,010,097	14,010,097	14,010,097	14,010,097	14,010,097	14,010,097	14,010,097	14,010,097	14,010,097	14,010,097
Future PFC Debt Service - Series 2013 (FY '13 projects)							6,981,109	6,981,109	6,981,109	6,981,109	6,981,109	6,981,109	6,981,109	6,981,109	6,981,109	6,981,109	6,981,109	6,981,109	6,981,109
Future PFC Debt Service - Series 2017 (FY '17 projects)											2,117,355	2,117,355	2,117,355	2,117,355	2,117,355	2,117,355	2,117,355	2,117,355	2,117,355
Annual Remaining for PAYG or Future Debt Service	$12,086,632	$4,005,800	($3,505,711)	$1,735,477	$4,387,455	$5,090,263	($1,162,687)	($11,681,704)	($1,864,376)	$141,891	($165,142)	$665,498	$1,524,725	$1,414,158	$3,290,645	$4,201,113	$5,147,180	$6,129,924	$7,151,504
Ending Balance	$12,086,632	$16,092,431	$12,586,720	$14,322,197	$18,709,652	$23,799,915	$22,637,228	$10,955,524	$9,091,148	$9,233,039	$9,067,897	$9,733,395	$11,258,120	$12,672,278	$15,962,923	$20,164,036	$25,311,215	$31,441,139	$38,592,643

Note:

1/ Based on forecast growth rate calculated by Ricondo & Associates, Inc., for the County's Series 2006 Bonds.

Source: Palm Beach County Department of Airports; Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

outstanding debt service, the funding of other reserves, and the payment of Airline Rebates. Any additional local funding, beyond what can be funded from the Improvement and Development Fund, would require the issuance of GARBs. Approximately $18.7 million of Master Plan project costs is expected to be funded from Airport funds.

3.2.5 General Airport Revenue Bonds (GARBs)

The County anticipates funding the $224 million long-term parking garage with GARB proceeds. This project is not anticipated to be necessary until FY 2023 and resulting annual debt service on the bonds is anticipated to be approximately $20 million per year based on the following assumptions:

- 30-year term
- One year construction period and capitalized interest period
- 6.5 percent interest rate

Establishment of a Debt Service Reserve Account equivalent to the maximum annual debt service.

4.0 Debt Service Requirements

Table 1.4 presents the annual estimated debt service requirements on the outstanding Airport Bonds as well as estimated debt service on projects expected to be funded with PFC-backed bonds for FY 2007 through FY 2017. As presented in Table 1.4, the annual debt service requirement is approximately $15.2 million from FY 2007 until FY 2011 when existing annual debt service increases to $17.3 million. In FY 2015, existing annual debt service decreases to $6.8 million. Debt service on the County's Series 2006B Bonds was structured to increase in FY 2015 to coincide with the retirement of the outstanding Series 2001 and Series 2002 Bonds.

As described previously, estimated annual PFC-backed debt on projects included in this Master Plan is projected to total $15.7 million in FY 2017 and ample capacity is expected to be available to fund the debt service from PFC revenues.

As described above, the parking garage is the only project included in this Master Plan that is planned to be funded with future long-term debt ($224 million) projected to begin in FY 2023. Resulting annual debt service is conservatively projected to be $20 million beginning in FY 2024. More detailed analysis should be performed as the project start date nears to determine if revenue bonds are the optimal funding source for this project.

Table 1.4

Projected Debt Service

Fiscal Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
SUBORDINATED INDEBTEDNESS	$1,262,500	$40,000	$1,080,000	$1,040,000	0	0	0	0	0	0	0
Existing Debt:											
Series 2001 [1]	8,205,813	8,267,363	8,288,363	8,313,938	0	0	0	0	0	0	0
Series 2002 [1]	2,611,075	2,611,075	2,611,075	2,611,075	12,881,075	13,015,550	13,033,338	13,218,750	0	0	0
Series 2006A [1,2]	3,418,480	3,418,480	3,418,480	3,418,480	3,418,480	3,418,480	3,418,480	3,418,480	3,418,480	3,418,480	3,418,480
Series 2006B [1,2]	995,288	995,288	995,288	995,288	995,288	995,288	995,288	995,288	3,420,288	3,417,092	3,415,628
TOTAL GARB DEBT SERVICE	$15,230,655	$15,292,205	$15,313,205	$15,338,780	$17,294,843	$17,429,318	$17,447,105	$17,632,518	$6,838,768	$6,835,572	$6,834,108
Future Debt:											
Series 2009 (PFC)	0	0	9,116,141	9,116,141	9,116,141	9,116,141	9,116,141	9,116,141	9,116,141	9,116,141	9,116,141
Series 2015 (PFC)	0	0	0	0	0	0	0	0	4,457,719	4,457,719	4,457,719
Series 2017 (PFC)	0	0	0	0	0	0	0	0	0	0	2,117,355
TOTAL FUTURE PFC DEBT SERVICE	$0	$0	$9,116,141	$9,116,141	$9,116,141	$9,116,141	$9,116,141	$9,116,141	$13,573,860	$13,573,860	$15,691,215

Notes:
1/ Series 2006 A & B Bonds Official Statement
2/ Columns may not add due to rounding.

Source: Series 2006 A & B Bonds Official Statement
Prepared by: Ricondo & Associates, Inc.

5.0 O&M Expenses

Projections of future O&M Expenses are based on analysis of historical activity, the anticipated effects of inflation, planned facility improvements and expansions, and forecast activity increases. **Table 1.5** presents projected O&M Expenses for FY 2007 through FY 2017.

As shown, O&M Expenses are projected to increase from $42.7 million in FY 2007 to $69.6 million in FY 2017, at a compounded annual growth rate of 5.0 percent.

Table 1.5

Projected O&M Expenses

Fiscal Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Airside	$6,030,836	$6,332,378	$6,648,997	$6,981,447	$7,330,519	$7,697,045	$8,081,897	$8,485,992	$8,910,292	$9,355,806	$9,823,597
Terminal	14,534,052	15,260,755	16,023,792	16,824,982	17,666,231	18,549,543	19,477,020	20,450,871	21,473,414	22,547,085	23,674,439
Tenant Equipment	1,690,460	1,774,983	1,863,732	1,956,918	2,054,764	2,157,502	2,265,377	2,378,646	2,497,579	2,622,458	2,753,580
Ground Transportation	13,131,749	13,788,336	14,477,753	15,201,641	15,961,723	16,759,809	17,597,799	18,477,689	19,401,574	20,371,652	21,390,235
Aviation	2,468,380	2,591,799	2,721,389	2,857,459	3,000,332	3,150,348	3,307,866	3,473,259	3,646,922	3,829,268	4,020,732
Non-Aviation	1,096,528	1,151,354	1,208,922	1,269,368	1,332,836	1,399,478	1,469,452	1,542,925	1,620,071	1,701,074	1,786,128
Terminal FIS	298,183	313,092	328,747	345,184	362,444	380,566	399,594	419,574	440,552	462,580	485,709
Lantana	687,429	721,800	757,890	795,785	835,574	877,352	921,220	967,281	1,015,645	1,066,427	1,119,749
Glades	810,215	850,725	893,262	937,925	984,821	1,034,062	1,085,765	1,140,054	1,197,056	1,256,909	1,319,754
North County Airport	1,855,819	1,948,610	2,046,041	2,148,343	2,255,760	2,368,548	2,486,975	2,611,324	2,741,890	2,878,985	3,022,934
Air Cargo Building	132,533	139,160	146,118	153,424	161,095	169,150	177,607	186,487	195,812	205,602	215,882
TOTAL O&M EXPENSES	$42,736,183	$44,872,993	$47,116,642	$49,472,474	$51,946,098	$54,543,403	$57,270,573	$60,134,102	$63,140,807	$66,297,847	$69,612,739

Source: Palm Beach County Department of Airports; Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

6.0 Airport Revenues (Nonairline and Airline)

Airport revenues are generated from nonairline sources, such as tenant leases and other miscellaneous agreements, and from airline sources in accordance with the Airline Agreements, Cargo Agreements, and the Bond Resolution. Nonairline revenues are categorized by the Direct Cost Center in which they occur.

6.1 Nonairline Revenues

Nonairline revenues for FY 2007 through FY 2017 are presented in **Table 1.6.** As shown, total Nonairline revenues are projected to increase from approximately $45.6 million in FY 2007 to approximately $63.0 million in FY 2017 at a compounded annual growth rate of 3.5 percent throughout the projection period.

6.1.1 Airside

The major source of nonairline revenues in the Airside Cost Center is aviation fueling. Total Airside revenues are projected to increase from approximately $1.3 million in FY 2007 to approximately $2.1 million in FY 2017. This increase represents a compounded annual growth rate of 4.6 percent during this period, and is the result of forecast growth in aircraft operations and the effects of inflation during the projection period.

6.1.2 Terminal

Nonairline revenues in the Terminal Cost Center primarily consist of rentals and fees from news and gift and food and beverage concessionaires, advertisers, and miscellaneous concessionaires, as well as nonairline Terminal rental revenues, airline reimbursements for tenant equipment and security charges, and federal inspection services (FIS) facility fees. These revenues are projected to increase from approximately $7.0 million in FY 2007 to approximately $9.5 million in FY 2017. This increase represents a compounded annual growth rate of 3.2 percent during this period, and is the result of forecast growth in numbers of enplaned passengers and the effects of inflation during the projection period.

6.1.3 Ground Transportation

Revenues from the Ground Transportation Cost Center primarily consist of automobile parking revenues, taxicab and limousine parking fees, and rental car concession fees. Total Ground Transportation revenues are projected to increase from approximately $29.4 million budgeted for FY 2007 to approximately $40.9 million in FY 2017. This increase represents a compounded annual growth rate of 3.4 percent during this period, and is the result of forecast growth in numbers of enplaned passengers and anticipated parking rate increases as well as the effects of inflation during the projection period.

Table 1.6

Projected Nonairline Revenues

Fiscal Year	2007	2008	2009	2010	2011	Projected 2012	2013	2014	2015	2016	2017
Airside Revenues	$1,326,699	$1,387,170	$1,452,929	$1,524,923	$1,593,351	$1,664,962	$1,739,932	$1,818,410	$1,900,604	$1,985,439	$2,074,188
Terminal Revenues	$6,914,483	$7,121,823	$7,346,609	$7,591,917	$7,826,078	$8,070,915	$8,327,012	$8,594,857	$8,875,141	$9,164,401	$9,466,760
Ground Transportation	$29,331,816	$30,133,886	$31,018,838	$32,002,464	$34,785,123	$35,718,278	$36,686,575	$37,691,203	$38,734,582	$39,792,780	$40,890,506
Aviation	$1,652,179	$1,696,344	$1,741,835	$1,788,690	$1,836,950	$1,886,659	$1,937,859	$1,990,594	$2,044,912	$2,100,860	$2,158,485
Air Cargo Facility	$236,900	$244,007	$251,327	$258,867	$266,633	$274,632	$282,871	$291,357	$300,098	$309,101	$318,374
Non-Aviation	$1,745,850	$1,798,226	$1,852,172	$1,907,737	$1,964,970	$2,023,919	$2,084,636	$2,147,175	$2,211,591	$2,277,938	$2,346,276
Other Revenues	$4,429,838	$4,594,906	$4,737,035	$4,845,357	$4,992,905	$5,188,212	$5,381,814	$5,553,745	$5,687,643	$5,732,447	$5,778,594
Total Nonairline Revenues	$45,637,765	$46,976,362	$48,400,745	$49,919,955	$53,266,011	$54,827,577	$56,440,699	$58,087,342	$59,754,571	$61,362,966	$63,033,183

Source: Palm Beach County Department of Airports; Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

6.1.4 Aviation

Revenues from the Aviation Cost Center consist primarily of facility and ground rents and flight kitchen revenues. These revenues are projected to increase from approximately $1.7 million in FY 2007 to approximately $2.2 million in FY 2017. This increase represents a compounded annual growth rate of 2.7 percent during this period, and reflects the expected effects of inflation during the projection period.

6.1.5 Air Cargo Building

Revenues from the Air Cargo Building are projected to increase from approximately $237,000 in FY 2007 to approximately $318,000 in FY 2017. This increase represents a compounded annual growth rate of 3.0 percent during this period, and is the result of the expected effects of inflation during the projection period.

6.1.6 Non-Aviation

Revenues from the Non-Aviation Cost Center consist of non-aviation ground and building rents. These revenues are projected to increase from approximately $1.7 million in FY 2007 to approximately $2.3 million in FY 2017. This increase represents a compounded annual growth rate of 3.0 percent during this period, and is the result of the expected effects of inflation during the projection period.

6.1.7 Other Revenues

Revenues from the three reliever general aviation airports and investment earnings are projected to increase from approximately $4.4 million in FY 2007 to approximately $5.8 million in FY 2017. This increase represents a compounded annual growth rate of 3.3 percent during this period, as a result of the expected effects of inflation and increasing fund balances during the projection period.

6.2 Airline Revenues

The remaining revenues generated at the Airport include Terminal rentals, landing fees, and apron fees payable by the airlines. In general, the airline rate-base for the Terminal rental rate and landing fee calculations consists of the following elements:

- **O&M Expenses -** These expenses are attributed to the various rate-setting areas for the Terminal and Airside Cost Centers and the allocated portion of indirect O&M Expenses.
- **O&M Reserve -** This requirement represents the amount necessary to fund and replenish the O&M Reserve Fund as required by the Bond Resolution, equal to one-sixth of O&M Expenses.
- **Debt Service -** Debt service requirements attributable to the rate-setting areas resulting from all GARBs and subordinate indebtedness.
- **Debt Service Coverage -** The County must maintain rental rates, fees, and charges sufficient to meet the rate covenant in the Bond Resolution.
- **Debt Service Reserve Funding -** As required by the Bond Resolution, the amount, if any, required to replenish the Debt Service Reserve Account to its minimum balance.

- **Amortization -** This amount represents the annual capital expenditures that were initially funded by the County and then amortized through the airline rate base over the useful life of the project.

Certain Terminal and Airside revenues offset these rate base items. As described previously, a portion of the funds remaining from the previous year (known as the Transfer) is allocated to the Signatory Airlines to partially offset their rentals, fees, and charges.

6.2.1 Terminal Rentals

The Terminal rental rate calculation combines Terminal Cost Center-specific Direct and Indirect O&M Expenses and the O&M Reserve requirement; total debt service, debt service coverage, and the debt service reserve requirement; and amortization; **less:** Concourse Security Reimbursements, Air Carrier FIS facility fees, and a portion of airline catering revenues. This net requirement is divided by the sum of rentable square footage in the Terminal to determine the average Terminal rental rate per square foot. Currently, the County assigns 80 percent of the Transfer to the Terminal rental rate calculation. The Transfer reduces the average Terminal rental rate to the Signatory Airline rental rate.

Table 1.7 presents the Terminal rental rate for FY 2007 through FY 2017. As shown, the Signatory Airline Terminal rental rate is projected to increase from $49.17 per square foot in FY 2007 to $56.50 per square foot in FY 2017 as a result of increasing O&M expenses partially offset by increased parking revenues and decreasing debt service that positively affect the airline Transfer included in the rate base.

6.2.2 Landing Fees

The Signatory Airline landing fee calculation combines Airside Cost Center-specific Direct and Indirect O&M Expenses and the O&M Reserve requirement; total debt service, debt service coverage and the debt service reserve requirement; and amortization; **less:** non-signatory airline landing fees, Airside services revenues, aviation fueling revenues, a portion of airline catering revenues, and 10% of the Airside requirement that is recovered from Apron fees. This net requirement is divided by landed weight to determine the Signatory Airline landing fee rate. The non-signatory airlines are assessed a 25 percent surcharge on the Signatory Airline landing fee rate.

Table 1.8 presents Signatory Airline landing fees for FY 2007 through FY 2017. As shown, the Signatory Airline landing fee rate is projected to decrease from $0.88 per 1,000 pounds of landed weight in FY 2007 to $0.94 per 1,000 pounds of landed weight in FY 2017 as a result of increased parking revenues and decreasing debt service that positively affect the airline Transfer included in the rate base partially offset by increasing O&M expenses.

Table 1.7

Terminal Rental Rates

Fiscal Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
					Projected						
TERMINAL RENTAL RATES:											
Operating Expenses	$14,534,052	$15,260,755	$16,023,792	$16,824,982	$17,666,231	$18,549,543	$19,477,020	$20,450,871	$21,473,414	$22,547,085	$23,674,439
O&M Reserve (1/6 annual)	140,779	147,990	155,390	163,159	171,317	179,883	188,877	198,321	208,237	218,649	229,581
Debt Service	5,698,193	5,727,885	5,738,015	5,750,353	6,693,957	6,758,828	6,767,409	6,856,852	1,649,947	1,648,405	1,647,699
Debt Service Coverage (25%)	1,424,548	1,431,971	1,434,504	1,437,588	1,673,489	1,689,707	1,691,852	1,714,213	412,487	412,101	411,925
Debt Service Reserve Requirement	0	0	0	0	0	0	0	0	0	0	0
Amortization Charges	461,484	697,593	697,593	697,593	692,348	611,238	611,238	611,238	438,912	438,912	438,912
Total Terminal Requirement	$22,259,057	$23,266,194	$24,049,294	$24,873,675	$26,897,343	$27,789,199	$28,736,396	$29,831,494	$24,182,997	$25,265,152	$26,402,556
Less:											
Concourse Security Reimbursements [1]	0	0	0	0	0	0	0	0	0	0	0
Air Carrier FIS Facility	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Applicable Direct Revenue and Reimburs:											
Airline Catering (25%)	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000
NET REQUIREMENT	$22,184,057	$23,191,194	$23,974,294	$24,798,675	$26,822,343	$27,714,199	$28,661,396	$29,756,494	$24,107,997	$25,190,152	$26,327,556
Rentable Terminal Area	329,766	348,339	348,339	348,339	348,339	348,339	348,339	348,339	348,339	348,339	348,339
Average Terminal Rental Rate	$67.27	$66.58	$68.82	$71.19	$77.00	$79.56	$82.28	$85.42	$69.21	$72.32	$75.58
Total Airline Terminal Space	274,613	288,843	288,843	288,843	288,843	288,843	288,843	288,843	288,843	288,843	288,843
Signatory Airline Leased Terminal Space	231,340	241,340	241,340	241,340	253,407	253,407	253,407	266,077	266,077	266,077	266,077
Airline Share of Net Requirement	$15,562,717	$16,067,560	$16,610,116	$17,181,272	$19,512,496	$20,161,296	$20,850,355	$22,729,359	$18,414,780	$19,241,380	$20,110,180
Less Transfers	4,188,085	2,233,831	2,574,432	2,133,072	2,128,739	3,242,534	3,183,193	3,120,767	3,439,933	5,283,148	5,077,601
Signatory Airline Requirement	11,374,632	13,833,729	14,035,684	15,048,200	17,383,757	16,918,762	17,667,163	19,608,592	14,974,848	13,958,231	15,032,579
Signatory Airline Leased Terminal Space	231,340	241,340	241,340	241,340	253,407	253,407	253,407	266,077	266,077	266,077	266,077
Signatory Terminal Rental Rate	$49.17	$57.32	$58.16	$62.35	$68.60	$66.77	$69.72	$73.70	$56.28	$52.46	$56.50
Terminal Revenue by Type:											
Type 1	$566,309	$658,809	$668,427	$716,646	$827,873	$805,729	$841,370	$933,828	$713,153	$664,738	$715,902
Type 2	3,663,902	4,539,827	4,606,103	4,938,381	5,704,843	5,552,245	5,797,848	6,434,969	4,914,309	4,580,685	4,933,255
Type 3	3,661,169	4,259,178	4,321,357	4,633,094	5,352,173	5,209,009	5,439,429	6,037,163	4,610,510	4,297,510	4,628,284
Type 4	3,041,034	3,861,465	3,917,837	4,200,465	4,852,399	4,722,603	4,931,507	5,473,426	4,179,990	3,896,218	4,196,105
Type 5	442,219	514,450	521,960	559,614	646,469	629,176	657,008	729,206	556,886	519,080	559,033
Total Terminal Revenue	$11,374,632	$13,833,729	$14,035,684	$15,048,200	$17,383,757	$16,918,762	$17,667,163	$19,608,592	$14,974,848	$13,958,231	$15,032,579

Notes:
1/ Effective October 1, 2006, the County discontinued a separate passenger screening charge.

Source: Palm Beach County Department of Airports; Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table 1.8

Projected Landing Fees

Fiscal Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
						Projected					
Landing Fees:											
Operating Expenses	$6,030,836	$6,332,378	$6,648,997	$6,981,447	$7,330,519	$7,697,045	$8,081,897	$8,485,992	$8,910,292	$9,355,806	$9,823,597
O&M Reserve (1/6 annual)	20,570	21,624	22,705	23,840	25,032	26,284	27,598	28,978	30,427	31,948	33,545
Debt Service	1,146,962	1,152,939	1,154,978	1,157,461	1,347,395	1,360,452	1,362,180	1,380,183	332,110	331,800	331,657
Debt Service Coverage (25%)	286,741	288,235	288,744	289,365	336,849	340,113	340,545	345,046	83,027	82,950	82,914
Debt Service Reserve Requirement	0	0	0	0	0	0	0	0	0	0	0
Amortization Charges	84,018	84,018	84,018	77,169	77,169	77,169	77,169	77,169	18,073	18,073	18,073
Total Airside Requirement	$7,569,127	$7,879,193	$8,199,442	$8,529,282	$9,116,964	$9,501,063	$9,889,388	$10,317,368	$9,373,929	$9,820,577	$10,289,787
Less:											
Applicable Direct Revenue and Reimburse:											
Nonsignatory Landing Fee Revenue	$75,869	$88,080	$90,451	$96,240	$104,210	$104,135	$109,132	$114,698	$97,238	$94,757	$101,404
Airside Services	30,900	31,827	32,782	33,765	34,778	35,822	36,896	38,003	39,143	40,317	41,527
Aviation Fueling	1,295,799	1,355,343	1,420,147	1,491,158	1,558,573	1,629,141	1,703,036	1,780,407	1,861,461	1,945,122	2,032,661
Airline Catering (25%)	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000
Apron Fees (10%)	756,913	787,919	819,944	852,928	911,696	950,106	988,939	1,031,737	937,393	982,058	1,028,979
ADJUSTED REQUIREMENT	$5,364,646	$5,571,023	$5,791,118	$6,010,191	$6,462,705	$6,736,860	$7,006,385	$7,307,524	$6,393,694	$6,713,323	$7,040,216
Less: Transfers	1,047,021	558,458	643,608	533,268	532,185	810,634	795,798	780,192	859,983	1,320,787	1,269,400
NET REQUIREMENT	$4,317,625	$5,012,565	$5,147,510	$5,476,923	$5,930,521	$5,926,226	$6,210,587	$6,527,332	$5,533,711	$5,392,536	$5,770,816
Signatory Landed Weight (1,000 pounds)	4,807,150	4,928,695	5,049,693	5,169,868	5,291,309	5,415,078	5,529,116	5,655,400	5,767,365	5,882,712	6,000,366
Nonsignatory Landed Weight (1,000 pounds)	78,165	80,141	82,109	84,063	86,038	88,050	89,904	91,958	93,778	95,654	97,567
Total Landed Weight (1,000 pounds)	4,885,315	5,008,837	5,131,802	5,253,930	5,377,346	5,503,128	5,619,020	5,747,358	5,861,143	5,978,366	6,097,933
Landing Fee Rate	$0.88	$1.00	$1.00	$1.04	$1.10	$1.08	$1.10	$1.13	$0.94	$0.90	$0.94
Nonsignatory Surcharge	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Nonsignatory Landing Fee Rate	$0.97	$1.10	$1.10	$1.14	$1.21	$1.18	$1.21	$1.25	$1.04	$0.99	$1.04
Signatory Landing Fee Revenue	$4,241,756	$4,924,485	$5,057,058	$5,380,683	$5,826,310	$5,822,091	$6,101,456	$6,412,634	$5,436,473	$5,297,779	$5,669,412
Nonsignatory Landing Fee Revenue	75,869	88,080	90,451	96,240	104,210	104,135	109,132	114,698	97,238	94,757	101,404

Source: Palm Beach County Department of Airports; Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

7.0 Cost per Enplaned Passenger

Airline revenues are divided by the number of enplaned passengers to yield the cost per enplaned passenger for the airlines in total. The number of enplaned passengers is forecast to increase at a compounded annual growth rate of 3.0 percent from FY 2007 through FY 2017. As presented in **Table 1.9**, the airline cost per enplaned passenger is projected to decrease from $4.93 in FY 2007 to $4.71 in FY 2017.

Table 1.9

Projected Cash Flow / Coverage Calculation / Cost per Enplaned Passenger

	Projected										
Fiscal Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Airline Revenues:											
Landing Fees	$4,317,625	$5,012,565	$5,147,510	$5,476,923	$5,930,521	$5,926,226	$6,210,587	$6,527,332	$5,533,711	$5,392,536	$5,770,816
Landing Fee Rebate	0	0	0	0	0	0	0	0	0	0	0
Apron Fees	756,913	787,919	819,944	852,928	911,696	950,106	988,939	1,031,737	937,393	982,058	1,028,979
Terminal Rentals	11,374,632	13,833,729	14,035,684	15,048,200	17,383,757	16,918,762	17,667,163	19,608,592	14,974,848	13,958,231	15,032,579
Tenant Equipment Charges	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000
Passenger Screening Revenues	0	0	0	0	0	0	0	0	0	0	0
FIS Revenues	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Total Airline Revenues	$18,679,170	$21,864,214	$22,233,138	$23,608,051	$26,455,974	$26,025,094	$27,096,689	$29,397,660	$23,675,952	$22,562,825	$24,062,374
Nonairline Revenues [1]	43,407,765	44,746,362	46,170,745	47,689,955	51,036,011	52,597,577	54,210,699	55,857,342	57,524,571	59,132,966	60,803,183
PFC Revenues Available for DS and Coverage	0	0	11,395,176	11,395,176	11,395,176	11,395,176	11,395,176	11,395,176	16,967,325	16,967,325	19,614,019
Subtotal Revenues	$62,086,935	$66,610,576	$79,799,059	$82,693,183	$88,887,161	$90,017,847	$92,702,564	$96,650,178	$98,167,847	$98,663,115	$104,479,576
Prior Year Transfer	5,608,942	3,166,125	3,591,876	3,040,176	3,034,760	4,427,004	4,352,827	4,274,795	4,673,752	6,843,292	6,586,246
TOTAL REVENUES	$67,695,877	$69,776,701	$83,390,935	$85,733,358	$91,921,921	$94,444,851	$97,055,391	$100,924,973	$102,841,599	$105,506,408	$111,065,822
Less: O&M Expenses	42,736,183	44,872,993	47,116,642	49,472,474	51,946,098	54,543,403	57,270,573	60,134,102	63,140,807	66,297,847	69,612,739
NET REVENUES	$24,959,694	$24,903,708	$36,274,292	$36,260,884	$39,975,823	$39,901,448	$39,784,818	$40,790,871	$39,700,793	$39,208,561	$41,453,083
Less: O&M Reserve	338,782	356,135	373,942	392,639	412,271	432,884	454,528	477,255	501,118	526,173	552,482
Debt Service	15,230,655	15,292,205	15,313,205	15,338,780	17,294,843	17,429,318	17,447,105	17,632,518	6,838,768	6,835,572	6,834,108
Future PFC Debt Service	0	0	9,116,141	9,116,141	9,116,141	9,116,141	9,116,141	9,116,141	13,573,860	13,573,860	15,691,215
Debt Service Reserve Requirement	0	0	0	0	0	0	0	0	0	0	0
Subordinated Debt Repayment	1,262,500	40,000	1,080,000	1,040,000	0	0	0	0	0	0	0
FUNDS REMAINING	$8,127,756	$9,215,368	$10,391,005	$10,373,324	$13,152,569	$12,923,106	$12,767,043	$13,564,958	$18,787,048	$18,272,956	$18,375,278
Coverage Calculation:											
Net Revenues less O&M Reserve	24,620,912	24,547,573	35,900,351	35,868,245	39,563,552	39,468,564	39,330,289	40,313,617	39,199,675	38,682,387	40,900,601
Debt Service	15,230,655	15,292,205	24,429,346	24,454,921	26,410,984	26,545,459	26,563,246	26,748,659	20,412,627	20,409,432	22,525,323
Coverage	1.62	1.61	1.47	1.47	1.50	1.49	1.48	1.51	1.92	1.90	1.82
Cost per Enplaned Passenger:											
Airline Revenues	$18,679,170	$21,864,214	$22,233,138	$23,608,051	$26,455,974	$26,025,094	$27,096,689	$29,397,660	$23,675,952	$22,562,825	$24,062,374
Enplanements	3,723,800	3,842,600	3,979,500	4,138,700	4,264,600	4,394,900	4,529,900	4,669,700	4,814,700	4,958,600	5,107,400
Cost Per Enplaned Passenger	$5.02	$5.69	$5.59	$5.70	$6.20	$5.92	$5.98	$6.30	$4.92	$4.55	$4.71

Notes:
1/ Does not include Tenant Equipment Charges, Passenger Screening Revenues, or FIS Revenues.

Source: Palm Beach County Department of Airports; Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

8.0 Cash Flow

Table 1.9 also shows the funds remaining after O&M Expenses and debt service are deducted from total revenues. The funds remaining are available for the calculation of debt service coverage and to fund capital projects. This table also shows the calculation of debt service coverage.

9.0 Debt Service Coverage

Debt service coverage is calculated by subtracting O&M Expenses and O&M Reserve from total revenues and then dividing the result by debt service for the period. Coverage must be at least 1.25 times debt service as required by the Bond Resolution. As presented in Table 1.9, debt service coverage for the Airport is projected to be higher than the minimum 1.25 times required in every year of the projection period, indicating that the Airport System is projected to have adequate resources to meet its debt service obligations throughout the projection period.

10.0 Summary of Baseline Scenario

Based on analyses of forecast activity at the Airport, in addition to projected revenues and expenses, and the Airport System Capital Improvement Plan for FY 2007 through FY 2025, it appears that the County has adequate resources and the Airport System has adequate growth capacity to meet future demand. The County has access to various sources of funding and, through a mix of FAA funding, State funding, PFC revenues, General Airport Revenue Bonds and PFC-backed bonds, and Airport funds. The capital projects recommended in the Master Plan appear to be financially feasible and the County can reasonably expect to implement these projects. The airline rates and overall airline cost per enplaned passenger remain reasonable over the shorter term planning period (through FY 2017) and projected Airport System funds appear to be adequate to effectively operate the Airport System. As required in the Bond Resolution, debt service coverage is projected to be significantly above the minimum 125 percent of debt service throughout the projection period.

11.0 Sensitivity Analysis 1

The baseline financial scenario was based on eligibility of projects for various types of funding. This section evaluates a modified funding scenario based on the following assumptions:

- FAA and State Funding are capped at Historical Levels experienced by the airport system.
- PFCs are collected at a $4.50 per enplaned passenger level.
- FAA entitlement are calculated based on the existing FAA formula incorporating the baseline forecast of enplanements and a $4.50 PFC.
- FAA discretionary funds for FY 2008 through FY 2016 are estimated to be $500,000 per year.
- Additional FAA discretionary funds for FY 2010 through FY 2014 are estimated to be $100 million for the five-year period, secured with an LOI and distributed over the five-year period ($20 million annually)
- FDOT funds are estimated to be $2.5 million per year for PBI; and $500,000 per year (total) for the 3 GA airports.
- FDOT (SIS) Funding is estimated to be $10,898,000 in FY 2009.
- Timing of projects is projected to be delayed when necessary to ensure adequate funding availability.
- Hangars at reliever / general aviation airports will be funded with bond proceeds and will only be undertaken if hangar revenues are sufficient to repay annual debt service.

Based on analyses of forecast activity at the Airport, in addition to projected revenues and expenses, and the Airport System Capital Improvement Plan for FY 2007 through FY 2025 based on the above assumptions, it appears that the County has adequate financial resources and the Airport System has adequate growth capacity to meet future demand under this scenario. However, airline rates and charges would increase significantly over the baseline scenario.

Table 1.10 presents the funding sources assumed in Scenario 1. After incorporating the funding sources and other assumptions, **Table 1.11** illustrates selected airline rates and charges, cost per enplanement, debt service coverage and ending balance in the Airport's capital account through FY 2017 that result from this scenario and compares the financial results to the baseline scenario. As presented, airline rates and charges are projected to be higher and the balance in the Airport's Improvement and Development fund is projected to be lower in Scenario 1 compared to the Baseline Scenario.

Table 1.10 (1 of 3)

Capital Improvement Plan – Summary of Funding Sources

Project	Total Project Escalated Dollars	Funding Source: AIP Ent	AIP Disc	FDOT	PFC	Airport Cash	GARBs
PALM BEACH INTERNATIONAL AIRPORT							
Expand and Rehab Overnight Parking Apron	$740,000	$0	$0	$370,000	$370,000	$0	$0
Apron "A" Expansion	3,420,000	0	0	1,220,000	2,200,000	0	0
NAVAID Relocation Study	300,000	0	0	0	300,000	0	0
Construct Maintenance Compound	1,000,000	0	0	0	1,000,000	0	0
Rehabilitate Aircraft Parking Apron	1,090,000	0	0	0	1,090,000	0	0
Extension of Taxiway "F" to RW 13	13,400,000	0	0	2,888,000	10,512,000	0	0
Extend Runway 9R-27L Environmental & Design	8,284,000	0	0	0	8,284,000	0	0
Extension of Taxiway "L" (Lima)	17,700,000	0	0	858,500	16,841,500	0	0
Miscellaneous taxiway rehab	5,250,000	0	0	1,253,500	2,625,000	1,371,500	0
New Taxiway Connector - Runway 9L-27R	5,300,000	1,676,250	500,000	0	662,500	2,461,250	0
Taxiway Romeo (West of R1)	20,825,398	0	3,733,333	0	837,500	3,629,167	12,625,398
Taxiway C4 High Speed Exit - Rwy 9L-27R	5,084,000	0	0	0	508,400	4,575,600	0
Taxiway D High Speed Exit - Rwy 9L-27R	4,721,000	0	0	0	472,100	4,248,900	0
Replace (2) Fire Rescue Vehicles	2,250,000	0	0	0	1,250,000	1,000,000	0
Concourse "A" Redevelopment	20,375,000	0	0	0	18,300,000	2,075,000	0
Acquire land runway 9L-27R	7,094,817	1,705,100	5,014,717	0	375,000	0	0
Taxiway Lima (West) Upgrades and Improvements	17,048,000	1,731,150	1,303,050	2,500,000	11,513,800	0	0
Runway 9R Property Acquisition	35,846,700	0	11,948,900	5,974,000	9,923,800	0	8,000,000
Golfview Apron, Taxilanes/Taxiways and Infrastructure	74,000,000	0	60,000,000	0	14,000,000	0	0
Golfview Facilities	130,000,000	0	0	2,500,000	127,500,000	0	0
Relocate VOR	3,939,281	0	0	1,414,000	2,525,281	0	0
Taxiway Charlie (East) Improvements	7,800,000	0	0	3,510,000	4,290,000	0	0
Extend, Relocate and Upgrade RWY 9R-27L	77,101,000	0	20,000,000	0	13,000,000	5,000,000	39,101,000
Construct Apron Golfview 2	6,000,000	0	0	0	6,000,000	0	0
Construct Surface Parking Lot	1,426,946	0	0	0	0	1,426,946	0
Demolition East of Runway 13-31	17,600,000	0	0	0	2,200,000	1,000,000	14,400,000
Demolition West of Runway 13-31	10,600,000	1,755,500	0	0	1,325,000	0	7,519,500
Runway 13-31 Pavement Removal	2,500,000	1,779,950	0	0	312,500	407,550	0
Runway 13-31, Taxiway F and Taxiway B Extensions and Taxiway Connectors	23,000,000	0	0	2,500,000	2,875,000	17,625,000	0
Part 150 Study PBIA	800,000	0	0	40,000	40,000	0	720,000

Table 1.10 (2 of 3)

Capital Improvement Plan – Summary of Funding Sources

Project	Total Project Escalated Dollars	Funding Source: AIP Ent	AIP Disc	FDOT	PFC	Airport Cash	GARBs
Rehabilitate Taxiway C	8,500,000	1,804,500	0	2,445,500	2,445,500	0	1,804,500
New Parking Revenue Center	2,609,546	0	0	0	0	2,609,546	0
New Cargo Apron	5,461,307	1,829,100	0	273,065	273,065	0	3,086,077
Concourse "B" Expansion	29,500,000	1,853,750	0	2,500,000	0	5,000,000	20,146,250
Miscellaneous Taxiway Rehab	2,687,834	0	500,000	0	0	0	2,187,834
New Belly Cargo/All Cargo Facility	33,131,938	0	0	0	0	0	33,131,938
Cargo Apron Expansion	3,070,758	1,878,425	0	0	153,538	0	1,038,795
Construct Surface Parking Lot	4,270,962	0	0	2,500,000	854,192	0	916,770
Terminal Building Baggage System Expansion	24,979,506	0	0	0	24,979,506	0	0
Construct Surface Parking Lot	5,806,149	0	0	0	0	5,806,149	0
New Parking Garage	224,176,582	0	0	0	0	0	224,176,582
Subtotal Palm Beach International Airport	$868,690,724	$16,013,725	$103,000,000	$32,746,565	$289,839,182	$58,236,608	$368,854,644
LANTANA							
Runway 33 Threshold Improvements	$150,000	$0	$142,500	$3,750	$3,750	$0	$0
Construct Hangars at Lantana	1,875,000	0	0	0	0	0	1,875,000
Construct Hangars (Rows 500, 600 & 700)	5,000,000	0	0	0	0	0	5,000,000
Upgrade Airfield Signage	400,000	0	0	0	10,000	390,000	0
Expand Itinerant Apron	6,200,000	0	0	0	1,240,000	4,960,000	0
Relocate Airport Rotating Beacon	100,000	0	0	0	5,000	0	95,000
Taxiway C Rehab	1,100,000	0	0	0	220,000	0	880,000
Apron Rehab	275,000	0	0	0	55,000	0	220,000
Rehab Runway 15/33	1,500,000	0	0	0	300,000	0	1,200,000
Rehab Runway 3/21	200,000	0	0	0	40,000	0	160,000
Construct Apron	2,200,000	0	0	500,000	0	1,700,000	0
Construct Hangars (Rows 1600, 1700, 1800 & 1900)	3,600,000	0	0	0	0	0	3,600,000
Construct Access Road to West SIde Development	250,000	0	0	200,000	50,000	0	0
Subtotal Lantana	$22,850,000	$0	$142,500	$703,750	$1,923,750	$7,050,000	$13,030,000

Table 1.10 (3 of 3)

Capital Improvement Plan – Summary of Funding Sources

Project	Total Project Escalated Dollars	Funding Source: AIP Ent	AIP Disc	FDOT	PFC	Airport Cash	GARBs
NORTH COUNTY AIRPORT							
Miscellaneous Pavement Rehab	$250,000	$0	$237,500	$6,250	$6,250	$0	$0
Construct Hangars at North County	1,875,000	0	0	0	0	0	1,875,000
Construct Apron and Taxilanes	1,875,000	0	0	500,000	375,000	1,000,000	0
Construct Service Road from Terminal to North T-Hangars	550,000	0	0	0	110,000	440,000	0
Construct Additional Tie-Down/Transient Apron	4,200,000	0	0	0	840,000	3,360,000	0
Construct Hangars	5,000,000	0	0	0	0	0	5,000,000
Hangar Construction Environmental Mitigation	2,500,000	0	0	0	500,000	0	2,000,000
Construct Parallel Runway	4,450,000	0	500,000	500,000	111,250	0	3,338,750
Environmental Mitigation Runway 13-31	5,000,000	0	0	4,000,000	1,000,000	0	0
Subtotal North County Airport	$25,700,000	$0	$737,500	$5,006,250	$2,942,500	$4,800,000	$12,213,750
GLADES							
T-Hangar Taxilane Rehab	$143,000	$0	$135,850	$3,575	$3,575	$0	$0
Construct T-Hangar Facilities	500,000	0	0	0	0	500,000	0
Runway 17/35 Crack Sealing	80,000	0	0	80,000	0	0	0
Construct T-Hangars	1,250,000	0	0	0	0	0	1,250,000
Install PAPIs and REILs	360,000	0	0	0	18,000	342,000	0
Expand Aircraft Parking Apron	1,500,000	0	500,000	500,000	300,000	0	200,000
Property Acquisition	1,000,000	0	0	0	0	1,000,000	0
Subtotal Glades	$4,833,000	$0	$635,850	$583,575	$321,575	$1,842,000	$1,450,000
TOTAL	$922,073,724	$16,013,725	$104,515,850	$39,040,140	$295,027,007	$71,928,608	$395,548,394
Total Funding Sources By Cost Center:							
Airside	$390,164,095	$14,159,975	$103,000,000	$25,246,565	$116,955,484	$40,318,967	$90,483,104
Terminal	74,854,506	1,853,750	0	2,500,000	43,279,506	7,075,000	20,146,250
Ground Transportation	238,290,185	0	0	2,500,000	854,192	9,842,641	225,093,352
Aviation	130,000,000	0	0	2,500,000	127,500,000	0	0
Lantana	22,850,000	0	142,500	703,750	1,923,750	7,050,000	13,030,000
Glades	4,833,000	0	635,850	583,575	321,575	1,842,000	1,450,000
North County Airport	25,700,000	0	737,500	5,006,250	2,942,500	4,800,000	12,213,750
Air Cargo Building	33,131,938	0	0	0	0	0	33,131,938
Fire Rescue	2,250,000	0	0	0	1,250,000	1,000,000	0
TOTAL	$922,073,724	$16,013,725	$104,515,850	$39,040,140	$295,027,007	$71,928,608	$395,548,394

Source: Palm Beach County Department of Airports; Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table 1.11

Cash Flow / Coverage Calculation / Cost Per Enplanement

Fiscal Year	Budget 2006	Projected 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Sensitivity Scenario 1:												
Signatory Landing Fee Rate	$1.06	$0.88	$1.00	$1.00	$1.05	$1.12	$1.66	$1.67	$2.73	$2.49	$2.43	$2.50
Average Terminal Rental Rate	$57.88	$49.17	$57.33	$58.39	$63.29	$69.95	$68.13	$70.54	$75.06	$55.91	$53.21	$63.52
Cost Per Enplanement	$6.24	$5.02	$5.69	$5.60	$5.77	$6.30	$6.81	$6.81	$8.57	$7.00	$6.65	$7.14
Debt Service Coverage	2.05	1.62	1.60	1.50	1.46	1.42	1.38	1.35	1.34	1.56	1.56	1.40
Airport Improvement and Development Fund Ending Balance	$39,780,563	$43,698,396	$38,851,750	$21,688,540	$23,644,887	$27,409,430	$12,457,154	$10,966,743	$13,843,325	$16,270,419	$23,628,478	$29,154,868
Baseline Scenario:												
Signatory Landing Fee Rate	$1.06	$0.88	$1.00	$1.00	$1.04	$1.10	$1.08	$1.10	$1.13	$0.94	$0.90	$0.94
Average Terminal Rental Rate	$57.88	$49.17	$57.32	$58.16	$62.35	$68.60	$66.77	$69.72	$73.70	$56.28	$52.46	$56.50
Cost Per Enplanement	$6.24	$5.02	$5.69	$5.59	$5.70	$6.20	$5.92	$5.98	$6.30	$4.92	$4.55	$4.71
Debt Service Coverage	2.05	1.62	1.61	1.47	1.47	1.50	1.49	1.48	1.51	1.92	1.90	1.82
Airport Improvement and Development Fund Ending Balance	$39,780,563	$44,101,396	$47,724,889	$50,421,682	$51,679,266	$56,875,796	$61,197,039	$66,160,252	$68,912,877	$71,213,167	$78,256,412	$85,086,148

Source: Palm Beach County Department of Airports; Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

12.0 Sensitivity Analysis 2

The baseline financial scenario was based on eligibility of projects for various types of funding. This section evaluates a modified funding scenario based on the following assumptions:

- FAA and State Funding are capped at Historical Levels experienced by the airport system.
- PFCs are collected at a $6.00 per enplaned passenger level starting in FY 2009.
- FAA entitlements are calculated based on the existing FAA formula incorporating the baseline forecast of enplanements and the PFC level. When the PFC level is assumed to increase to $6.00, entitlements will be eliminated.
- FAA discretionary funds for FY 2008 through FY 2016 are estimated to be $500,000 per year.
- Additional FAA discretionary funds for FY 2010 through FY 2014 are estimated to be $100 million for the five-year period, secured with an LOI and distributed over the five-year period ($20 million annually)
- FDOT funds are estimated to be $2.5 million per year for PBI; and $500,000 per year (total) for the 3 GA airports.
- FDOT (SIS) Funding is estimated to be $10,898,000 in FY 2009.
- Timing of projects is projected to be delayed when necessary to ensure adequate funding availability.
- Hangars at reliever / general aviation airports will be funded with bond proceeds and will only be undertaken if hangar revenues are sufficient to repay annual debt service.

Based on analyses of forecast activity at the Airport, in addition to projected revenues and expenses, and the Airport System Capital Improvement Plan for FY 2007 through FY 2025 based on the above assumptions, it appears that the County has adequate financial resources and the Airport System has adequate growth capacity to meet future demand under this scenario. However, airline rates and charges would increase over the baseline scenario.

Table 1.12 presents the funding sources assumed in Scenario 2. After incorporating the funding sources and other assumptions, **Table 1.13** illustrates selected airline rates and charges, cost per enplanement, debt service coverage and ending balance in the Airport's capital account through FY 2017 that result from this scenario and compares the financial results to the baseline scenario. As presented, airline rates and charges are projected to be higher and the balance in the Airport's Improvement and Development Fund is projected to be lower in Scenario 2 compared to the Baseline Scenario. However, this scenario is projected to reflect lower rates and charges and a higher balance in the Improvement and Development Fund than Scenario 1 presented in the previous section.

Table 1.12 (1 of 2)

Capital Improvement Plan – Summary of Funding Sources

Project	Total Project Escalated Dollars	Funding Source: AIP Ent	AIP Disc	FDOT	PFC	Airport Cash	GARBs
PALM BEACH INTERNATIONAL AIRPORT							
Expand and Rehab Overnight Parking Apron	$740,000	$0	$0	$370,000	$370,000	$0	$0
Apron "A" Expansion	3,420,000	0	0	1,220,000	2,200,000	0	0
NAVAID Relocation Study	300,000	0	0	0	300,000	0	0
Construct Maintenance Compound	1,000,000	0	0	0	1,000,000	0	0
Rehabilitate Aircraft Parking Apron	1,090,000	0	0	0	1,090,000	0	0
Extension of Taxiway "F" to RW 13	13,400,000	0	0	2,888,000	10,512,000	0	0
Extend Runway 9R-27L Environmental & Design	8,284,000	0	0	0	8,284,000	0	0
Extension of Taxiway "L" (Lima)	17,700,000	0	0	858,500	16,841,500	0	0
Miscellaneous taxiway rehab	5,250,000	0	0	1,253,500	2,625,000	1,371,500	0
New Taxiway Connector - Runway 9L-27R	5,300,000	1,676,250	500,000	0	662,500	2,461,250	0
Taxiway Romeo (West of R1)	20,825,398	0	3,733,333	0	3,070,833	1,395,833	12,625,398
Taxiway C4 High Speed Exit - Rwy 9L-27R	5,084,000	0	0	0	3,050,400	2,033,600	0
Taxiway D High Speed Exit - Rwy 9L-27R	4,721,000	0	0	0	2,832,600	1,888,400	0
Replace (2) Fire Rescue Vehicles	2,250,000	0	0	0	2,250,000	0	0
Concourse "A" Redevelopment	20,375,000	0	0	0	18,300,000	2,075,000	0
Acquire land runway 9L-27R	7,094,817	0	5,014,717	0	2,080,100	0	0
Taxiway Lima (West) Upgrades and Improvements	17,048,000	0	1,303,050	2,500,000	13,244,950	0	0
Runway 9R Property Acquisition	35,846,700	0	11,948,900	5,974,000	17,923,800	0	0
Golfview Apron, Taxilanes/Taxiways and Infrastructure	74,000,000	0	60,000,000	0	14,000,000	0	0
Golfview Facilities	130,000,000	0	0	2,500,000	127,500,000	0	0
Relocate VOR	3,939,281	0	0	1,414,000	2,525,281	0	0
Taxiway Charlie (East) Improvements	7,800,000	0	0	3,510,000	4,290,000	0	0
Extend, Relocate and Upgrade RWY 9R-27L	77,101,000	0	20,000,000	0	32,545,150	24,555,850	0
Construct Apron Golfview 2	6,000,000	0	0	0	6,000,000	0	0
Construct Surface Parking Lot	1,426,946	0	0	0	0	1,426,946	0
Demolition East of Runway 13-31	17,600,000	0	0	0	17,600,000	0	0
Demolition West of Runway 13-31	10,600,000	0	0	0	10,600,000	0	0
Runway 13-31 Pavement Removal	2,500,000	0	0	0	2,500,000	0	0
Runway 13-31, Taxiway F and Taxiway B Extensions and Taxiway Connectors	23,000,000	0	0	2,500,000	20,500,000	0	0
Part 150 Study PBIA	800,000	0	0	40,000	760,000	0	0
Rehabilitate Taxiway C	8,500,000	0	0	2,445,500	6,054,500	0	0
New Parking Revenue Center	2,609,546	0	0	0	0	2,609,546	0
New Cargo Apron	5,461,307	0	0	273,065	273,065	0	4,915,177
Concourse "B" Expansion	29,500,000	0	0	2,500,000	0	5,000,000	22,000,000
Miscellaneous Taxiway Rehab	2,687,834	0	500,000	0	2,187,834	0	0
New Belly Cargo/All Cargo Facility	33,131,938	0	0	0	0	0	33,131,938
Cargo Apron Expansion	3,070,758	0	500,000	0	153,538	2,417,220	0
Construct Surface Parking Lot	4,270,962	0	0	2,500,000	854,192	0	916,770
Terminal Building Baggage System Expansion	24,979,506	0	0	0	24,979,506	0	0
Construct Surface Parking Lot	5,806,149	0	0	0	0	5,806,149	0
New Parking Garage	224,176,582	0	0	0	0	0	224,176,582
Subtotal Palm Beach International Airport	$868,690,724	$1,676,250	$103,500,000	$32,746,565	$379,960,749	$53,041,294	$297,765,865

Table 1.12 (2 of 2)

Capital Improvement Plan – Summary of Funding Sources

Project	Total Project Escalated Dollars	Funding Source: AIP Ent	AIP Disc	FDOT	PFC	Airport Cash	GARBs
LANTANA							
Runway 33 Threshold Improvements	$150,000	$0	$142,500	$3,750	$3,750	$0	$0
Construct Hangars at Lantana	1,875,000	0	0	0	0	0	1,875,000
Construct Hangars (Rows 500, 600 & 700)	5,000,000	0	0	0	0	0	5,000,000
Upgrade Airfield Signage	400,000	0	0	0	10,000	390,000	0
Expand Itinerant Apron	6,200,000	0	0	0	1,240,000	4,960,000	0
Relocate Airport Rotating Beacon	100,000	0	0	0	5,000	95,000	0
Taxiway C Rehab	1,100,000	0	0	0	220,000	880,000	0
Apron Rehab	275,000	0	0	0	55,000	220,000	0
Rehab Runway 15/33	1,500,000	0	0	0	300,000	1,200,000	0
Rehab Runway 3/21	200,000	0	0	0	40,000	160,000	0
Construct Apron	2,200,000	0	0	500,000	0	1,700,000	0
Construct Hangars (Rows 1600, 1700, 1800 & 1900)	3,600,000	0	0	0	0	0	3,600,000
Construct Access Road to West SIde Development	250,000	0	0	200,000	50,000	0	0
Subtotal Lantana	$22,850,000	$0	$142,500	$703,750	$1,923,750	$9,605,000	$10,475,000
NORTH COUNTY AIRPORT							
Miscellaneous Pavement Rehab	$250,000	$0	$237,500	$6,250	$6,250	$0	$0
Construct Hangars at North County	1,875,000	0	0	0	0	0	1,875,000
Construct Apron and Taxilanes	1,875,000	0	0	500,000	375,000	1,000,000	0
Construct Service Road from Terminal to North T-Hangars	550,000	0	0	0	110,000	440,000	0
Construct Additional Tie-Down/Transient Apron	4,200,000	0	0	0	840,000	3,360,000	0
Construct Hangars	5,000,000	0	0	0	0	0	5,000,000
Hangar Construction Environmental Mitigation	2,500,000	0	0	0	500,000	0	2,000,000
Construct Parallel Runway	4,450,000	0	0	500,000	111,250	0	3,838,750
Environmental Mitigation Runway 13-31	5,000,000	0	0	4,000,000	1,000,000	0	0
Subtotal North County Airport	$25,700,000	$0	$237,500	$5,006,250	$2,942,500	$4,800,000	$12,713,750
GLADES							
T-Hangar Taxilane Rehab	$143,000	$0	$135,850	$3,575	$3,575	$0	$0
Construct T-Hangar Facilities	500,000	0	0	0	0	500,000	0
Runway 17/35 Crack Sealing	80,000	0	0	80,000	0	0	0
Construct T-Hangars	1,250,000	0	0	0	0	0	1,250,000
Install PAPIs and REILs	360,000	0	0	0	18,000	342,000	0
Expand Aircraft Parking Apron	1,500,000	0	0	500,000	300,000	0	700,000
Property Acquisition	1,000,000	0	0	0	0	1,000,000	0
Subtotal Glades	$4,833,000	$0	$135,850	$583,575	$321,575	$1,842,000	$1,950,000
TOTAL	$922,073,724	$1,676,250	$104,015,850	$39,040,140	$385,148,574	$69,288,294	$322,904,615
Total Funding Sources By Cost Center:							
Airside	$390,164,095	$1,676,250	$103,500,000	$25,246,565	$206,077,051	$36,123,653	$17,540,575
Terminal	74,854,506	0	0	2,500,000	43,279,506	7,075,000	22,000,000
Ground Transportation	238,290,185	0	0	2,500,000	854,192	9,842,641	225,093,352
Aviation	130,000,000	0	0	2,500,000	127,500,000	0	0
Lantana	22,850,000	0	142,500	703,750	1,923,750	9,605,000	10,475,000
Glades	4,833,000	0	135,850	583,575	321,575	1,842,000	1,950,000
North County Airport	25,700,000	0	237,500	5,006,250	2,942,500	4,800,000	12,713,750
Air Cargo Building	33,131,938	0	0	0	0	0	33,131,938
Fire Rescue	2,250,000	0	0	0	2,250,000	0	0
TOTAL	$922,073,724	$1,676,250	$104,015,850	$39,040,140	$385,148,574	$69,288,294	$322,904,615

Source: Palm Beach County Department of Airports
Prepared by: Ricondo & Associates, Inc.

Table 1.13

Financial Results for Sensitivity 2 and Baseline Scenario

Fiscal Year	Budget 2006	Projected 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Sensitivity Scenario 2:												
Signatory Landing Fee Rate	$1.06	$0.88	$1.00	$1.00	$1.05	$1.11	$1.09	$1.12	$1.47	$1.27	$1.24	$1.27
Average Terminal Rental Rate	$57.88	$49.17	$57.33	$58.39	$63.08	$69.62	$67.83	$70.82	$74.81	$57.93	$55.11	$66.41
Cost Per Enplanement	$6.24	$5.02	$5.69	$5.60	$5.76	$6.28	$6.00	$6.06	$6.81	$5.45	$5.14	$5.66
Debt Service Coverage	2.05	1.62	1.60	1.50	1.46	1.40	1.38	1.36	1.35	1.56	1.55	1.39
Airport Improvement and Development Fund Ending Balance	$39,780,563	$43,698,396	$38,851,750	$29,885,874	$29,391,926	$34,251,051	$37,242,362	$40,835,370	$18,484,377	$20,042,742	$23,996,922	$28,497,294
Baseline Scenario:												
Signatory Landing Fee Rate	$1.06	$0.88	$1.00	$1.00	$1.04	$1.10	$1.08	$1.10	$1.13	$0.94	$0.90	$0.94
Average Terminal Rental Rate	$57.88	$49.17	$57.32	$58.16	$62.35	$68.60	$66.77	$69.72	$73.70	$56.28	$52.46	$56.50
Cost Per Enplanement	$6.24	$5.02	$5.69	$5.59	$5.70	$6.20	$5.92	$5.98	$6.30	$4.92	$4.55	$4.71
Debt Service Coverage	2.05	1.62	1.61	1.47	1.47	1.50	1.49	1.48	1.51	1.92	1.90	1.82
Airport Improvement and Development Fund Ending Balance	$39,780,563	$44,101,396	$47,724,889	$50,421,682	$51,679,266	$56,875,796	$61,197,039	$66,160,252	$68,912,877	$71,213,167	$78,256,412	$85,086,148

Source: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Technical Report #7

North Palm Beach County General Aviation Airport Layout Plan

North Palm Beach County General Aviation Airport

Prepared for

Palm Beach County Department of Airports

OCTOBER 2006

CH2MHILL
In Association with Ricondo & Associates, Inc.

Contents

SECTION 1

Airport Layout Plan Narrative

1.1 Introduction

The proposed 20-year development plan for the North Palm Beach County General Aviation Airport (F45) is depicted graphically on the Airport Layout Plan (ALP), illustrating existing and ultimate airport facilities that will be required to accommodate the forecast future demand. The drawings were prepared in accordance with Federal Aviation Administration (FAA) guidelines as defined in FAA Advisory Circular 150/5070-6A, *Airport Master Plans*, and Advisory Circular 150/5300-13, Change 10, *Airport Design*. The ALP provides both airport and airfield facility data and design criteria to define relationships with applicable planning and design standards. The attached ALP and the following paragraphs describe the major components of the future F45 development plan. Additionally, the FAA ALP Drawing Set Checklist for the Southern Region Airports Division is provided in **Appendix A.**

1.2 Runway System

The F45 runway system consists of Runway 8R/26L, a 4,300 foot long by 100 feet wide asphalt concrete runway, Runway 13/31, a 4,300 foot long by 75 foot wide asphalt concrete runway, and Runway 8L/26R, a 3,700 foot long by 75 foot wide turf runway.

Runway 8R is currently a precision instrument runway equipped with an instrument landing system (ILS) and an approach lighting system (MALSR). Runway 26L is currently a nonprecision instrument runway served by a GPS approach. The existing asphalt concrete pavement is in good condition, and the DOA has no plans for maintenance or rehabilitation in the near future. However, the current runway markings are marked as nonprecision instrument and should be upgraded to precision instrument markings. The asphalt concrete pavement for Runway 8R/26L is published at 12,500 pounds pavement strength.

Runway 13/31 is currently a visual runway, and it is recommended that this runway be upgraded to a nonprecision runway in the 20 year planning period. The DOA also has plans to extend the Runway 13 end by 1,700 feet during the 20-year planning period, yielding a 6,000 foot runway to better accommodate corporate jet aircraft. The runway/parallel taxiway separation distance will also be increased from 240 feet to 300 feet to accommodate the change from a B-II runway to a C-II runway. Runway 13/31 is published at a 30,000-pound pavement strength to accommodate dual wheel corporate jet aircraft. The existing asphalt concrete pavement is in good condition, and the DOA has no plans for maintenance or rehabilitation in the near future, with the possible exception of minor crack sealing.

Runway 8L/26R is currently a visual turf runway limited to small aircraft. Future plans indicate no major changes to Runway 8L/26R with the exception of additional turf taxiways to support the ground traffic to the hangar development area on the north side of the

airfield. The runway may eventually be paved with asphalt concrete pavement, as shown in the previous ALP, but would remain visual.

1.3 Land Acquisition

No land acquisition is required to control heights and land use within the RPZs at F45. The DOA may construct a new access road from Beeline Highway, and as such, will need permission from the State of Florida and CSX to create a new intersection.

1.4 Runway Approach Aids and Lighting

Runway 8R/26L is currently a precision instrument runway equipped with a localizer and glide slope antenna for ILS approach. Runway 8R also has a MALSR approach lighting system to further complete the NAVAID requirements for a CAT I approach. The runway is equipped with high intensity runway edge lighting, Precision Approach Path Indicator (PAPI) systems, and Runway End Identifier Lights (REILs) at both runway ends. The Runway 8R approach is currently served by VOR and GPS equipment, in addition to an ILS. The Runway 26L approach is currently served by a GPS approach.

Runway 13/31 is currently a visual runway. The runway is currently equipped with medium intensity runway edge lighting, PAPIs and REILs on both ends. Since this runway is being extended in the future, it is recommended that it be upgraded to a nonprecision instrument runway to better serve the anticipated corporate jet traffic.

Runway 8L/26R is currently a visual approach at both ends and is limited to small, propeller aircraft. The runway is not currently lighted or equipped with visual approach aids. PAPIs and REILs are planned for Runway 8L/26R within the 20 year planning period.

In an effort to provide enhanced facilities and aeronautical services at F45, the Palm Beach County Department of Airports is strongly encouraged to pursue the initiation and programming of an Instrument Landing System (ILS) on the crosswind runway, Runway 13/31. The introduction of an ILS approach will provide enhanced capability during inclement weather.[1]

1.5 Taxiway System

The parallel taxiways serving Runway 8L/26R and 13/31 meet FAA standards for separation between runway centerline and taxiway centerline. The taxiway pavement system is generally in good condition, with no plans for major maintenance or rehabilitation in the near future, only minor crack sealing and patching is needed. Additional connector taxiways and an extension of Taxiway F as a parallel taxiway to the Runway 13 extension are planned for the future. The existing taxiways are generally lighted with Medium Intensity Taxiway Edge Lighting (MITL), with the exception of the turf taxiways which have no edge lights.

[1] Recommendations of the AAAB – Addendum #1, March 10, 2008

1.6 Landside Facilities

Terminal Building

The existing terminal building is centrally located with sufficient landside and airside access. The existing terminal building meets forecast demand over the 20-year planning period.

1.7 Aircraft Storage Facilities

The north side of the airfield will continue to be used as the primary area for aircraft storage facility expansion. Three rows of t-hangars and one row of corporate hangars are proposed to take advantage of existing taxilanes which were constructed for this purpose. These taxilanes will be extended to the north to provide for additional hangar space to meet demand. Furthermore, additional corporate hangars and conventional hangars are proposed to the west of the t-hangar facilities to meet the forecast demand for these facilities in the 20-year planning period. A new apron and access road is proposed for landside access to these proposed facilities. Additional conventional hangars are also proposed at the end of the existing terminal road cul-de-sac. These facilities are in various stages of planning and are likely to be the first hangar facilities constructed as funding comes available. The Terminal Area Drawing provided as part of the ALP set shows the proposed hangar development in greater detail.[2]

1.8 Airside Development

Apron expansion is recommended for airside development at F45 to accommodate anticipated future growth of transient and based aircraft. A large area of apron expansion northwest of the terminal building is planned and is depicted on the ALP. This area fills in an existing grassy area between Taxiway J and future Taxiway D. Another apron expansion is planned to provide sufficient aircraft parking space for the new conventional hangar development at the end of the terminal access road. Finally, additional apron is planned to accommodate parking needs for the northern conventional hangar, corporate hangar and t-hangar facility expansion. This development is projected to provide aircraft parking needs for the 20-year planning period.

Based on discussions with DOA staff, additional helicopter parking areas have been shown on the ALP. Existing helicopter parking is at capacity, and the DOA requires another area to be shown for dedicated helicopter parking. This area has been shown on the existing ramp south of the existing electrical vault and fuel farm, oriented parallel to Taxiway K.

The ALP currently shows a large area of apron expansion to the northwest of the existing terminal building. The area is presently shown as fixed-wing tiedowns, however, as demand for helicopter parking increases, this area can be modified to show additional helicopter parking locations in this area.[1]

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[2] It should be noted that the area to the north of F45 is reserved for non-aviation development, and is subject to state and federal environmental processes.

[1] Recommendations of the AAAB – Addendum #1, March 10, 2008

1.9 Automobile Access /Parking

The DOA has indicated that one or two additional ingress/egress points from Beeline Highway to the interior airport roadways may be needed in the future. Two tentative locations have been shown for additional intersections on the ALP in the event that the DOA decides to pursue these intersections further.

The Department of Airports is currently working on a project to increase the parking capacity adjacent to the terminal building and surrounding hangars/offices, based on initial plans for the facility that were not constructed when the airport opened. The Department of Airports will continue to evaluate the need and demand for additional parking in the future and will implement improvements as necessary.[1]

1.10 Airspace

The airport airspace drawing is based upon Federal Aviation Regulations (FAR) Part 77, Objects Affecting Navigable Airspace. The drawing identifies imaginary surfaces which protect the runway approaches and the airport environment, and when penetrated, identify objects as obstructions. The drawings are based upon the ultimate planned runway length as well as the ultimate planned approaches to each runway end.

Also provided are drawings depicting the individual runway inner approach surfaces with plans and profiles that identify potential obstructions, again based on ultimate runway length and ultimate planned approaches. These drawings are intended to facilitate identification of roadways, utility lines, railroads, structures and other possible obstructions that may lie within the confines of the inner approach surface area associated with each runway end. The approach slopes for each runway are described below:

- Runway 8R/26L: the drawing is based on larger than utility criteria with a 50:1 precision approach to Runway 8R and a 34:1 nonprecision approach to Runway 26L
- Runway 13/31: the drawing is based on a future 34:1 approach slope for Runway 13, and a 20:1 visual approach slope for Runway 31
- Runway 8L/26R: the drawing is based on 20:1 visual approaches to both Runway 8L and Runway 26R

No obstructions were identified in the immediate vicinity of the airport.

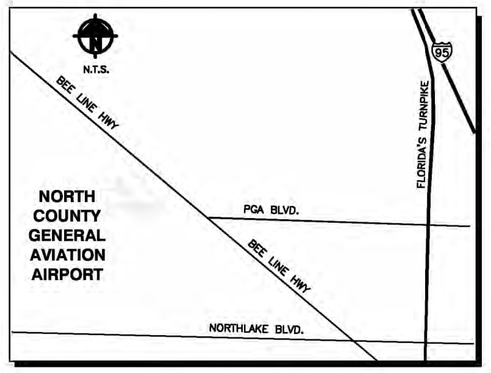
1.11 Airport Property Map

An airport property map is provided and indicates the airport boundary and how various tracts of land were acquired. The purpose of the Airport Property Map is to provide information for analyzing the current and future aeronautical use of land acquired with Federal funds.

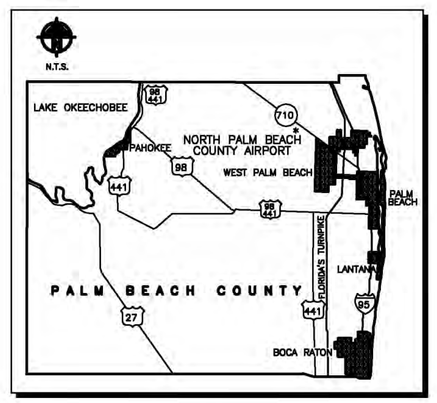
[1] Recommendations of the AAAB – Addendum #1, March 10, 2008

AIRPORT PLANS PACKAGE
NORTH PALM BEACH COUNTY AIRPORT
GENERAL AVIATION
NORTH PALM BEACH, FLORIDA

JUNE 2007
DOA PROJECT NO. I-06-DOA-C-004



VICINITY MAP
N.T.S.



LOCATION MAP
N.T.S.

BOARD OF COUNTY COMMISSIONERS

	KAREN T. MARCUS	DISTRICT 1
VICE CHAIR	JEFF KOONS	DISTRICT 2
	WARREN H. NEWELL	DISTRICT 3
	MARY McCARTY	DISTRICT 4
	BURT AARONSON	DISTRICT 5
	JESS R. SANTAMARIA	DISTRICT 6
CHAIRPERSON	ADDIE L. GREENE	DISTRICT 7

COUNTY ADMINISTRATOR
ROBERT WEISMAN

DEPARTMENT OF AIRPORTS
BRUCE V. PELLY, DIRECTOR OF AIRPORTS
JERRY L. ALLEN, DEPUTY DIRECTOR OF AIRPORTS
GARY SYPEK, DIRECTOR OF PLANNING

DRAWING INDEX TABLE

APPROVED BY

FEDERAL AVIATION ADMINISTRATION DATE:

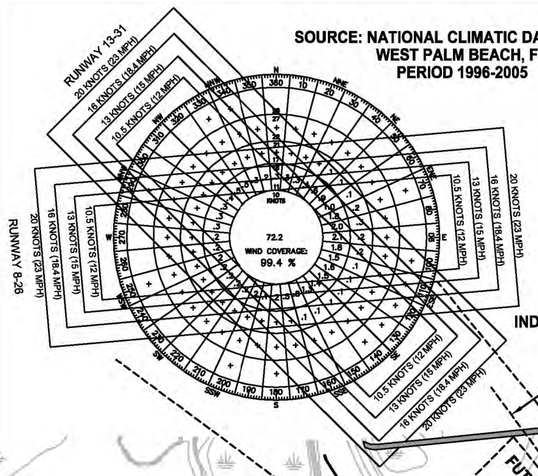
PALM BEACH COUNTY
DEPARTMENT OF AIRPORTS DATE:

CH2MHILL

ACCEPTANCE OF THIS REPORT BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE FAA TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

FAA'S APPROVAL OF THIS AIRPORT LAYOUT PLAN (ALP) REPRESENTS ACCEPTANCE OF THE GENERAL LOCATION OF FUTURE FACILITIES DEPICTED. DURING THE PRELIMINARY DESIGN PHASE, THE AIRPORT OWNER IS REQUIRED TO RESUBMIT FOR APPROVAL FINAL LOCATIONS, HEIGHTS, AND EXTERIOR FINISH OF STRUCTURES WHICH COULD ADVERSELY AFFECT SAFETY, EFFICIENCY OR UTILITY OF THE AIRPORT. FAA CONCERN IS OBSTRUCTIONS, IMPACT ON ELECTRONIC AIDS OR ADVERSE EFFECT ON CONTROLLER VIEW OF AIRCRAFT APPROACHES AND GROUND MOVEMENT AREAS.

SOURCE: NATIONAL CLIMATIC DATA CENTER
WEST PALM BEACH, FL
PERIOD 1996-2005



CONSTRUCTION NOTICE REQUIREMENT

TO PROTECT OPERATIONAL SAFETY AND FUTURE DEVELOPMENT, ALL PROPOSED CONSTRUCTION ON THE AIRPORT MUST BE COORDINATED WITH THE FAA AIRPORTS DISTRICT OFFICE PRIOR TO CONSTRUCTION. FAA's REVIEW TAKES APPROXIMATELY 60 DAYS.

LEGEND

EXISTING	FUTURE	ITEM
	–	AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT
		PAVEMENT
		BUILDINGS
	–	CANAL
	–	RAILROAD
	–	WETLANDS (NOTE 1)
	–	BERM
P	–	PRESERVE BOUNDARY
X	–	PRESERVE AREA FENCE
	–	SECURITY FENCE
	–	WIND CONE
	–	PRECISION APPROACH PATH INDICATOR
		RUNWAY END IDENTIFIER LIGHTS

– DENOTES NO ANTICIPATED CHANGE

AIRPORT DATA TABLE

	EXISTING	FUTURE
AIRPORT ELEVATION (MSL)	21.5'	21.5'
AIRPORT REFERENCE POINT (ARP)	LAT 26°50'39.697"	LAT 26°50'45.347"
	LON 80°13'16.787"	LON 80°13'20.442"
AIRPORT & TERMINAL NAVAIDS	VOR, GPS, ILS	VOR, GPS, ILS
	PAPI, MALSR, REIL	PAPI, MALSR, REIL
MEAN DAILY MAX. TEMP. HOTTEST MONTH (AUG)	95.5°	95.5°
AIRPORT REFERENCE CODE (ARC)	B-II	C-II
OWNER	PALM BEACH COUNTY	PALM BEACH COUNTY

TAXIWAY DATA TABLE

TAXIWAY	LENGTH (FT)	WIDTH (FT)	LIGHTS
C	3500	35	NONE
C1	300	40	NONE
D	2200	35	NONE
E	300	35	NONE
F	4350(6445 FUT)	35 (50' FUT.)	MITL
G	160	35	NONE
H	160	35	NONE
I	160	35	NONE
J	300	35	MITL
K	4300	35 (50' FUT.)	MITL
L	240	35	MITL
M	240	35	MITL
N	240	35	MITL
O	300	35	MITL
P	240	35	MITL
Q	240	35	MITL

BUILDING DATA TABLE

	EXISTING	TOP EL.
100	TERMINAL	55.1'
11200	T-HANGAR	39.9'
11210	T-HANGAR	50.0'
11220	T-HANGAR	43.7'
11230	T-HANGAR	43.2'
11240	T-HANGAR	43.0'
11250	CORPORATE HANGARS	49.3'
11300	T-HANGARS/SHADE PORT	38.8'
11350	T-HANGAR	38.5'
11550	STORAGE HANGAR	57.1'
11610	MAINTENANCE HANGAR	57.4'
11720	T-HANGAR	46.8'
11730	T-HANGAR	45.7'
11740	T-HANGAR	43.9'
11750	T-HANGAR	43.9'
	ELECTRICAL VAULT	35.6'
	FUTURE	
11620	CORPORATE HANGAR	50.0' *
11630	CORPORATE HANGAR	50.0' *
11640	CORPORATE HANGAR	50.0' *
11650	CORPORATE HANGAR	50.0' *
11660	BUILDING	20.0'*
11760	T-HANGAR	45.0' *
11770	T-HANGAR	45.0' *
11780	T-HANGAR	45.0' *
11790	T-HANGAR	45.0' *
11800	CORPORATE HANGAR	50.0' *
11810	CORPORATE HANGAR	50.0' *
11820	CORPORATE HANGAR	50.0' *
11830	AIR TRAFFIC CONTROL TOWER	65.0' *
11840	AIRPORT RESCUE AND FIREFIGHTING	50.0' *

* APPROXIMATE ASSUMED HEIGHT

NOTES

1. WETLANDS SHOWN ARE BASED ON FIELD/PHOTO OBSERVATION AND ARE SUBJECT TO REVISION BASED ON JURISDICTIONAL DETERMINATION.
2. FUTURE RUNWAY 13 END LOCATION IS SUBJECT TO CHANGE BASED ON JURISDICTIONAL DETERMINATION OF WETLANDS.
3. ALL ELEVATIONS ARE MEAN SEA LEVEL (MSL)
4. HORIZONTAL DATUM IS NAD 83.
5. VERTICAL DATUM IS NAVD 88.
6. THE EXTENSION OF RUNWAY 13-31 IS SUBJECT TO APPROVAL BY THE CITY OF PALM BEACH GARDENS PER THE INTER-LOCAL AGREEMENT WITH THE PALM BEACH COUNTY DEPARTMENT OF AIRPORTS.
7. THE ALP CURRENTLY SHOWS A LARGE AREA OF APRON EXPANSION TO THE NORTHWEST OF THE EXISTING TERMINAL BUILDING; THE AREA IS PRESENTLY SHOWN AS FIXED-WING TIEDOWNS, HOWEVER, AS DEMAND FOR HELICOPTER PARKING INCREASES, THIS AREA CAN BE MODIFIED TO SHOW ADDITIONAL HELICOPTER PARKING LOCATIONS IN THIS AREA.

SCALE IN FEET: 500 250 0 500 1000 1500

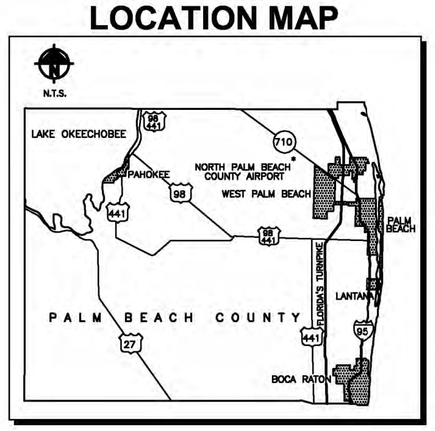
VARIATION 5° 47' W (2006)
MAGNETIC
TRUE
RATE OF CHANGE 0° 4' W / YEAR
SOURCE: NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

RUNWAY DATA TABLE

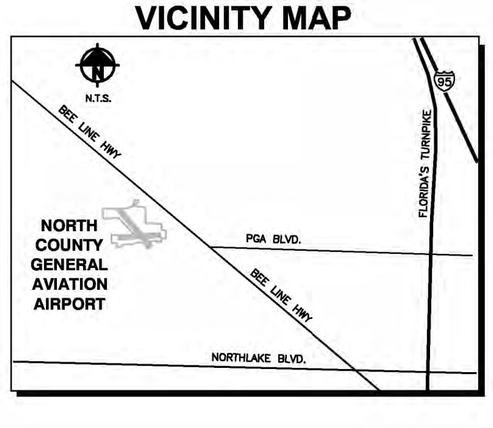
- DENOTES NO ANTICIPATED CHANGE

	8R		26L		8L		26R		13		31	
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
RUNWAY LENGTH (FT)	4,300'	-	4,300'	-	3,700'	-	3,700'	-	4,300'	6000'	4,300'	6000'
RUNWAY WIDTH (FT)	100'	-	100'	-	75'	-	75'	-	75'	100'	75'	100'
AZIMUTH	85°	-	265°	-	85°	-	265°	-	135°	-	135°	-
PAVEMENT STRENGTH (1000 lbs.)	12.5	-	12.5	-	12.5	-	12.5	-	30	-	30	-
GEAR LOADING	DUAL		DUAL		SINGLE		SINGLE		DUAL		DUAL	
PAVEMENT TYPE	ASPHALT	-	ASPHALT	-	TURF	ASPHALT	TURF	ASPHALT	ASPHALT	-	ASPHALT	-
EFFECTIVE GRADIENT %	0.00	-	0.00		0.01		0.01	-	0.00		0.00	
RUNWAY END COORDINATES	N 26°50'33.09"		N 26°50'36.54"		N 26°50'56.98"		N 26°50'59.95"		N 26°51'00.34"	N 26°51'11.71"	N 26°50'29.45"	
NAD 83	W 80°13'36.69"		W 80°12'49.38"		W 80°13'49.29"		W 80°13'08.58"		W 80°13'37.90"	W 80°13'50.43"	W 80°13'03.88"	
RUNWAY END ELEVATIONS (MSL)	21.5'	-	21.5'	-	20.6'	-	20.8'	-	21.45'	-	21.5'	-
RUNWAY LIGHTING	HIRL	-	HIRL	-	NONE	MIRL	NONE	MIRL	MIRL	-	MIRL	-
TAXIWAY LIGHTING	MITL	-	MITL	-	NONE	MITL	NONE	MITL	MITL	-	MITL	-
RUNWAY MARKING	NON-PRECISION	PRECISION	NON-PRECISION	NON-PRECISION	NONE	VISUAL	NONE	VISUAL	NON-PRECISION	-	VISUAL	-
CRITICAL AIRCRAFT	CESSNA CITATION VI		CESSNA CITATION VI		SMALL AIRCRAFT ONLY				CESSNA CITATION VI		CESSNA CITATION VI	
AIRPORT REFERENCE CODE	B II	C II	B II	C II	B II	-	B II	-	B II	C II	B II	C II
FAR PART 77 APPROACH SURFACE	50:1	-	34:1	-	20:1	-	20:1	-	20:1	34:1	20:1	-
APPROACH VISIBILITY MINIMUMS	3/4-MILE	-	1-MILE	-	1-MILE	-	1-MILE	-	1-MILE	-	1-MILE	-
NAVIGATIONAL AIDS/APPROACHES	ILS, MALSR	-	PAPI, REIL	-	NONE	PAPI, REIL	NONE	PAPI, REIL	PAPI, REIL	-	PAPI, REIL	-
	PAPI, REIL		GPS	GPS, LPV								
	VOR, GPS	VOR, GPS,LPS										
RUNWAY SAFETY AREA (RSA) WIDTH	150'	500'	150'	500'	150'	-	150'	-	150'	500'	150'	500'
RSA LENGTH BEYOND RUNWAY END	300'	1000'	300'	1000'	300'	-	300'	-	300'	1000'	300'	1000'
RUNWAY OBJECT FREE AREA WIDTH	500'	800'	500'	800'	500'	-	500'	-	500'	800'	500'	800'
OFA LENGTH BEYOND RUNWAY END	300'	1000'	300'	1000'	300'	-	300'	-	300'	1000'	300'	1000'

LOCATION MAP



VICINITY MAP



REVISIONS

NO.	DATE	BY	APPD	DESCRIPTION
1	02/19/08	DCT		ADDENDUM NO.1

PROJECT MGR: CIN	SCALE: AS SHOWN
PLANNER: CIN	DATE: OCTOBER 2006
DRAWN BY: PIT	CHECKED BY: WPB

APPROVALS

Federal Aviation Administration
By: _____
Title: _____ Date
Case No: _____

Palm Beach County Department of Airports
By: _____
Jerry Allen
Title: _____
Director of Planning & Development Date

NORTH PALM BEACH COUNTY AIRPORT

AIRPORT LAYOUT PLAN

REVISION DATE: MARCH 10, 2008
PRINT DATE: MARCH 10, 2008
DEPT. OF AIRPORTS NO.: TASK I-06-DOA-C-004
SHEET NO.: 2 of 9

ACCESS ROAD

NEW ACCESS ROAD

CANAL

11770

11760

11780

11800

11810

11820

11830

800'

NEW GA APRON

356'

NEW FUELING APRON

11750

11740

11730

11720

BRL

STATE ROAD 710 - BEELINE HIGHWAY

CSX RAILROAD

CANAL

EXISTING PRESERVE LIMITS

EX. & FUT. 20:1 VISUAL APPROACH SURFACE

T/L "F"

TURF T/W "C"

370'

240'

300'

200'

TURF T/W "C"

T/W "G1"

RSA

ROFZ

EXISTING 3,700' X 75' TURF RUNWAY 8L-26R

TURF T/W "I" (FUTURE)

TURE T/W "H" (FUTURE)

250'

RSA

TURF T/W "G" (FUT.)

ROFZ

RPZ (500' X 700' X 1000')

EX. & FUT. 20:1 VISUAL APPROACH SURFACE

TURF T/W "D" (FUT.)

370'

152'

1076'

BRL

T/W "D"

450'

ROFZ

11630

11620

11650

11640

RUNWAY 26R END
LAT: 26°50'59.95"
LONG: 80°13'08.58"
EL. 20.8'

EXISTING BORROW LAKE

EXISTING PRESERVE

PAPI

ROFZ

369'

1159'

600'

ROFA

11610

TERMINAL

100

11550

ELECTRICAL VAULT

FUEL FARM

RELOCATED HELICOPTER PARKING

BRL

T/W "J"

495'

FUTURE AVIATION DEVELOPMENT AREA

EXISTING 3,700' X 75' TURF RUNWAY 8L-26R

250'

ROFZ

ROFA

RSA

HELICOPTER PARKING TO BE RELOCATED

11250

11220

11200

11230

11210

11350

11240

11300

BORROW LAKE

BRL

RPZ (1000' X 1510' X 1700')

LOCALIZER ANTENNA

745'

T/W "K"

ROFA

150'

T/W "K"

T/W "F"

T/W "D"

T/W "E"

300'

150'

200'

EXISTING FENCE

TRUE NORTH

ANNUAL RATE OF CHANGE: 7' WEST

MAG. DEC. 5° 47' W (2006)
RATE OF CHANGE 0° 4' W/YEAR

GRAPHIC SCALE (feet)

200 100 0 200 400 800

BUILDING DATA TABLE

	EXISTING	TOP EL.
100	TERMINAL	55.1'
11200	T-HANGAR	39.9'
11210	T-HANGAR	50.0'
11220	T-HANGAR	43.7'
11230	T-HANGAR	43.2'
11240	T-HANGAR	43.0'
11250	CORPORATE HANGARS	49.3'
11300	T-HANGARS/SHADE PORT	38.8'
11350	T-HANGAR	38.5'
11550	STORAGE HANGAR	57.1'
11610	MAINTENANCE HANGAR	57.4'
11720	T-HANGAR	46.8'
11730	T-HANGAR	45.7'
11740	T-HANGAR	43.9'
11750	T-HANGAR	43.9'
	ELECTRICAL VAULT	35.6'
	FUTURE	
11620	CORPORATE HANGAR	
11630	CORPORATE HANGAR	
11640	CORPORATE HANGAR	
11650	CORPORATE HANGAR	
11760	T-HANGAR	
11770	T-HANGAR	
11780	T-HANGAR	
11800	CORPORATE HANGAR	
11810	CORPORATE HANGAR	
11820	CORPORATE HANGAR	
11830	CORPORATE HANGAR	

LEGEND

ITEM	EXISTING	ULTIMATE
GROUND CONTOUR	15	
AIRPORT PROPERTY LINE		
ROADS		
BUILDINGS		
AIRFIELD PAVEMENT		
SECURITY FENCE		
NAVAIDS		
WIND CONE		
BEACON		
SEG CIRCLE/WIND TEE		
AIRPORT REFERENCE POINT		
AVIGATION EASEMENT		
POWER LINE		
PAVEMENT TO BE ABANDONED		
BLAST PAD		

DEPARTMENT OF AIRPORTS
PALM BEACH COUNTY

CH2MHILL

REVISIONS

NO.	DATE	BY	DESCRIPTION	APP'D

PROJECT MGR: CIN	SCALE: AS SHOWN
PLANNER: CIN	DATE: JULY 2006
DRAWN BY: PIT	CHECKED BY: WPB

APPROVALS

Federal Aviation Administration

By: _____

Title: _____ Date

Case No: _____

Palm Beach County Department of Airports

By: _____
Jerry Allen

Title: _____
Director of Planning & Development Date

NORTH PALM BEACH COUNTY AIRPORT

TERMINAL AREA DRAWING

REVISION DATE

PRINT DATE: JUNE 2007

DEPT. OF AIRPORTS NO. --

SHEET NO. 3 of 9

USER: HFLORES1 TAB: 22X34 FILENAME: F45MBA30.DWG PLOT DATE: 22-Jun-07 PLOT TIME: 10:19:26 AM

J. W. CORBETT

WILDLIFE

MANAGEMENT AREA

40:1 APPROACH SURFACE
40,000FT LONG
4,000FT INNER WIDTH
16,000FT OUTER WIDTH

50:1 PRECISION
APPROACH SURFACE
10,000FT LONG
1,000FT INNER WIDTH
4,000FT OUTER WIDTH

34:1 NON-PRECISION
APPROACH SURFACE

LOXAHATCHEE SLOUGH
NATURAL AREA

BEELINE HWY

NORTH COUNTY AIRPORT
NATURAL AREA

20:1 VISUAL
APPROACH
SURFACE

20:1 VISUAL
APPROACH
SURFACE

PRIMARY
SURFACE

PGA BLVD

AIRPORT
ELEVATION
21.5' (MSL)

20:1 VISUAL
APPROACH
SURFACE

34:1 NON-PRECISION
INSTRUMENT
APPROACH
SURFACE

LOXAHATCHEE SLOUGH
NATURAL AREA

HORIZONTAL SURFACE
171.5' (MSL)

20:1 CONICAL SURFACE

NORTHLAKE BLVD

WEST PALM BEACH
WATER
CATCHMENT
AREA

MAG. DEC. 5° 47' W (2006)
RATE OF CHANGE 0° 4' W/YEAR

SCALE IN FEET
0 2500 5,000 7,500 10,000

DEPARTMENT OF AIRPORTS
PALM BEACH COUNTY

CH2MHILL

REVISIONS

NO.	DATE	BY	DESCRIPTION	APPD

PROJECT MGR: CIN	SCALE: AS SHOWN
PLANNER: CIN	DATE: OCTOBER 2006
DRAWN BY: PIT	CHECKED BY: WPB

APPROVALS

Federal Aviation Administration

By: _____

Title: _____ Date

Case No: _____

Palm Beach County Department of Airports

By: _____
Jerry Allen

Title: _____
Director of Planning & Development Date

NORTH PALM BEACH
COUNTY AIRPORT

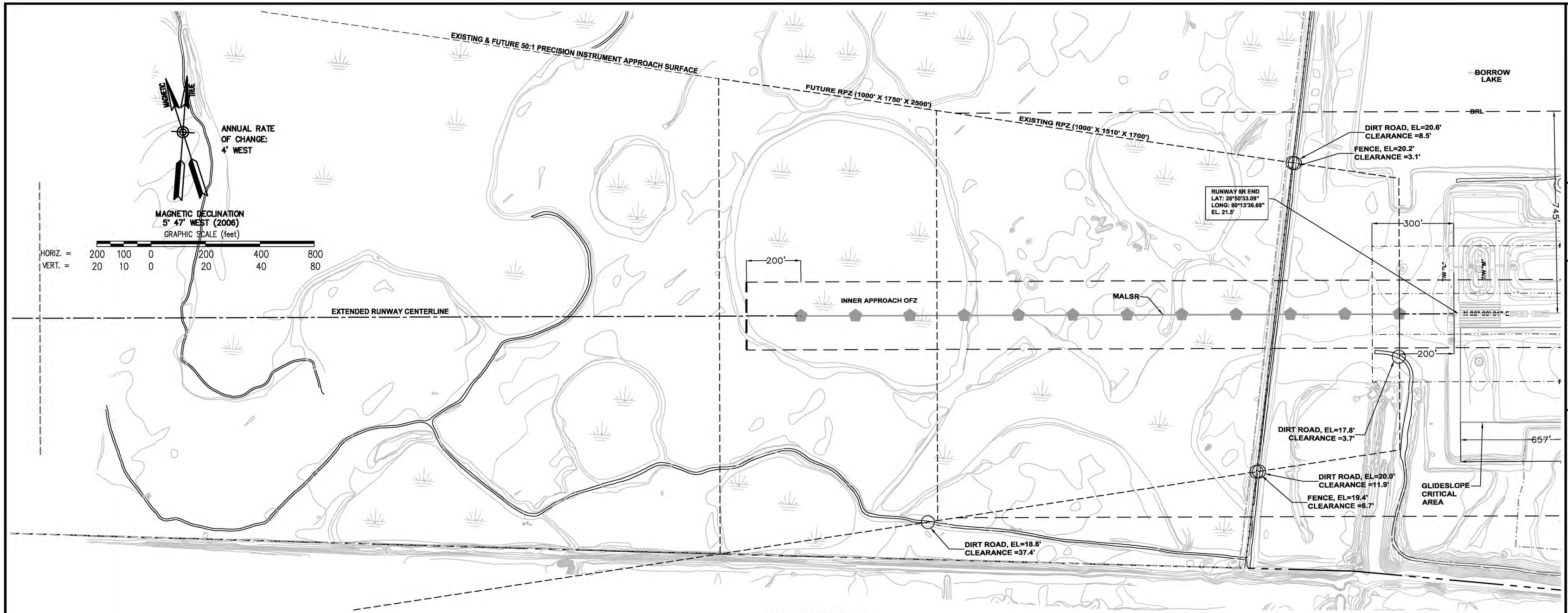
AIRPORT
PART 77 SURFACE

REVISION DATE

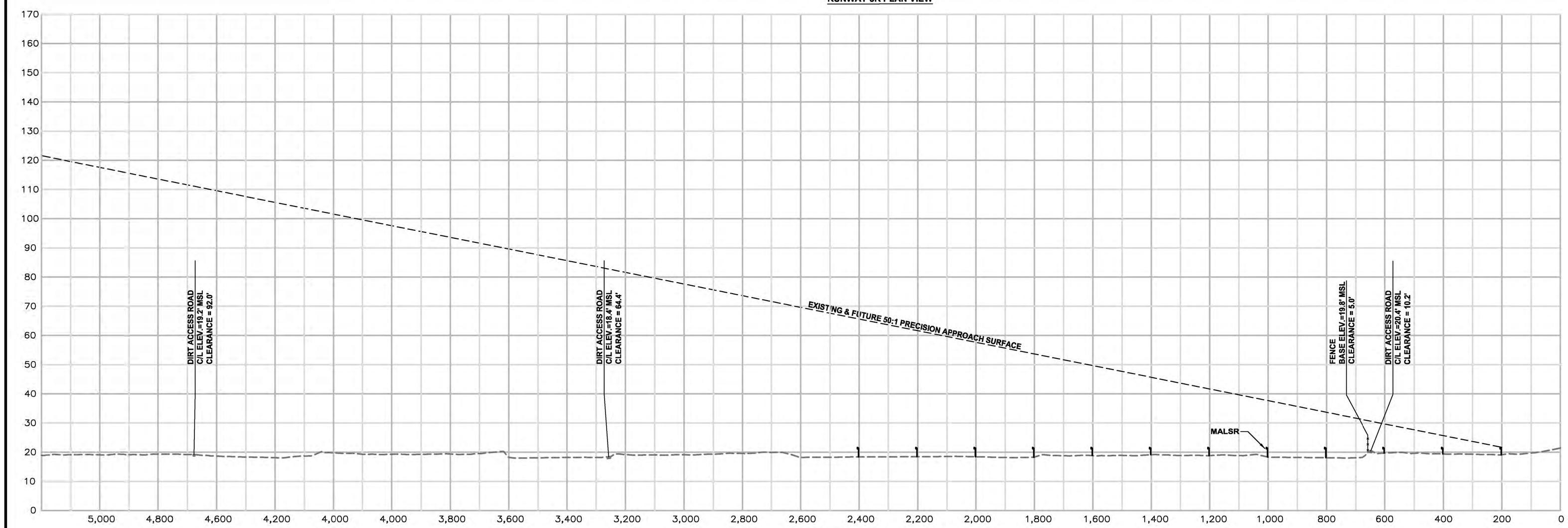
PRINT DATE
JUNE 2007

DEPT. OF AIRPORTS NO.
--

SHEET NO.
4 of 9



RUNWAY 8R PLAN VIEW



RUNWAY 8R PROFILE VIEW

DEPARTMENT OF AIRPORTS
PALM BEACH COUNTY

CH2MHILL

REVISIONS

NO.	DATE	BY	DESCRIPTION	APP'D

PROJECT MGR: CIN	SCALE: AS SHOWN
PLANNER: CIN	DATE: JULY 2006
DRAWN BY: PIT	CHECKED BY: WPB

APPROVALS

Federal Aviation Administration

By: _____

Title: _____ Date

Case No: _____

Palm Beach County Department of Airports

By: _____
Jerry Allen

Title: _____
Director of Planning & Development Date

NORTH PALM BEACH COUNTY AIRPORT

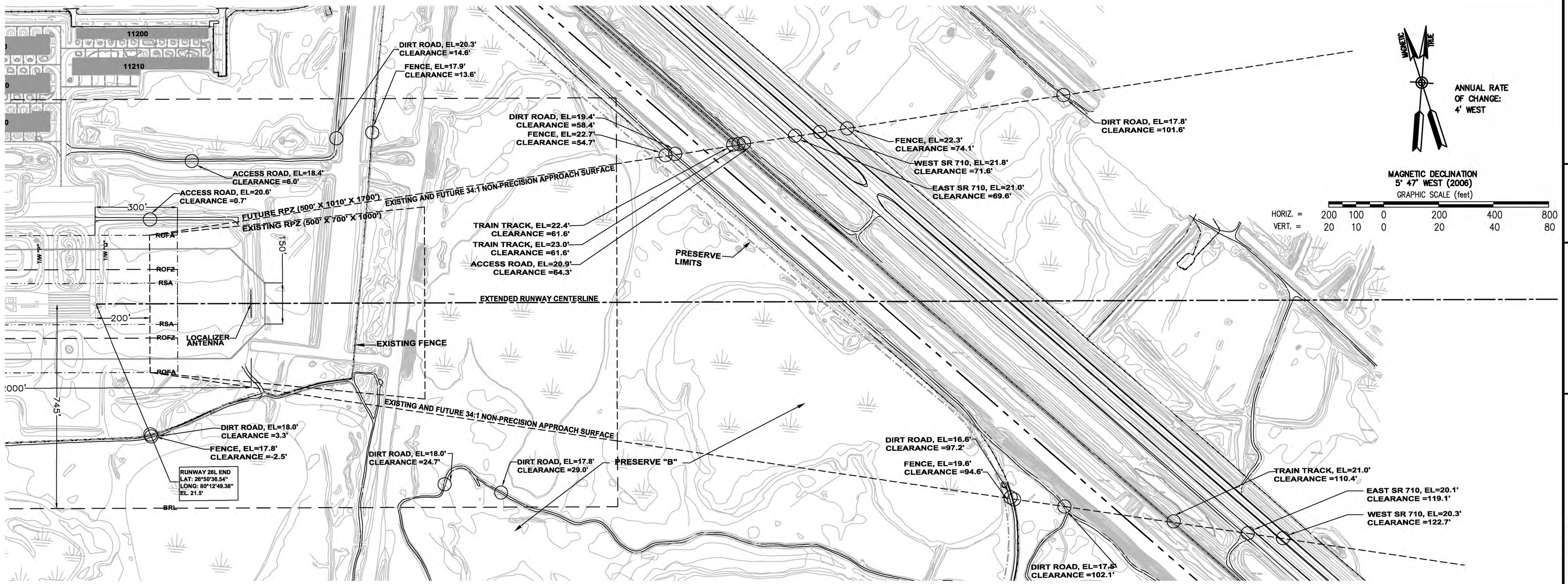
RUNWAY 8R INNER APPROACH SURFACE

REVISION DATE

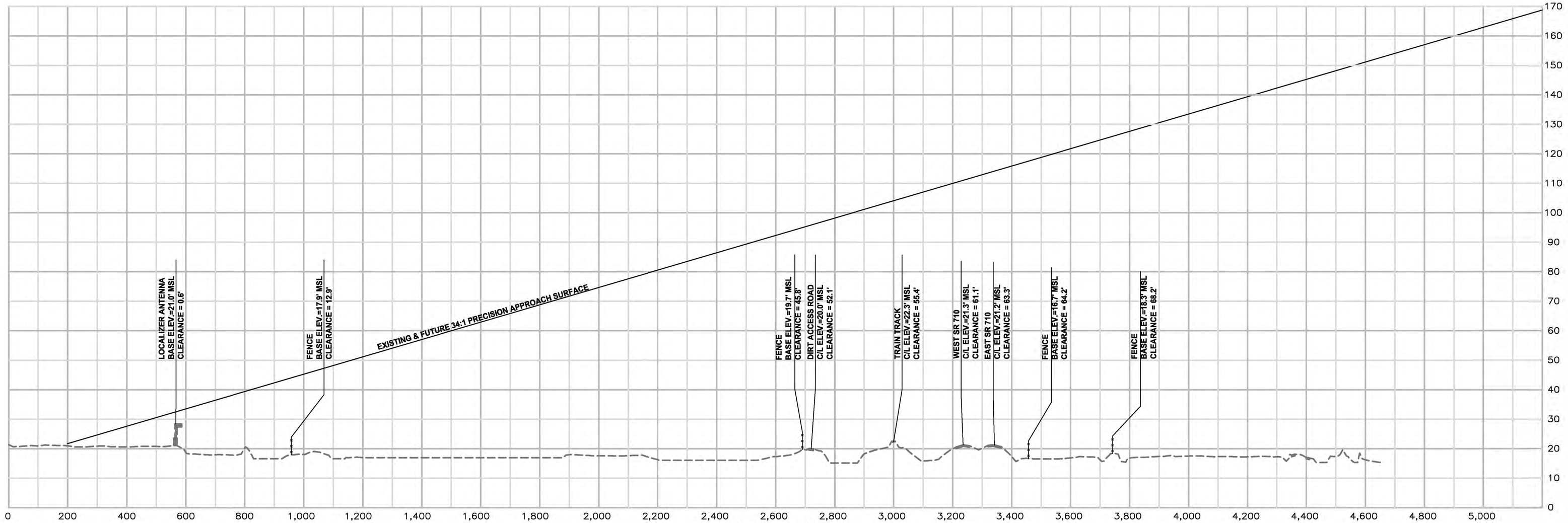
PRINT DATE
JUNE 2007

DEPT. OF AIRPORTS NO.
--

SHEET NO.
5 of 9



RUNWAY 26L PLAN VIEW



RUNWAY 26L PROFILE VIEW

DEPARTMENT OF AIRPORTS
PALM BEACH COUNTY

CH2MHILL

REVISIONS

NO.	DATE	BY	DESCRIPTION	APP'D

PROJECT MGR: CIN	SCALE: AS SHOWN
PLANNER: CIN	DATE: JULY 2006
DRAWN BY: PIT	CHECKED BY: WPB

APPROVALS

Federal Aviation Administration

By: _____

Title: _____ Date

Case No: _____

Palm Beach County Department of Airports

By: _____
Jerry Allen

Title: _____
Director of Planning & Development Date

NORTH PALM BEACH COUNTY AIRPORT

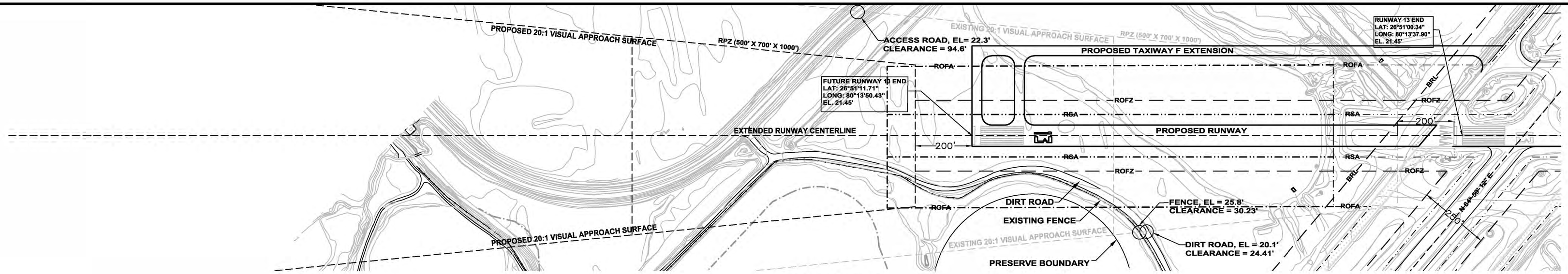
RUNWAY 26L INNER APPROACH SURFACE

REVISION DATE

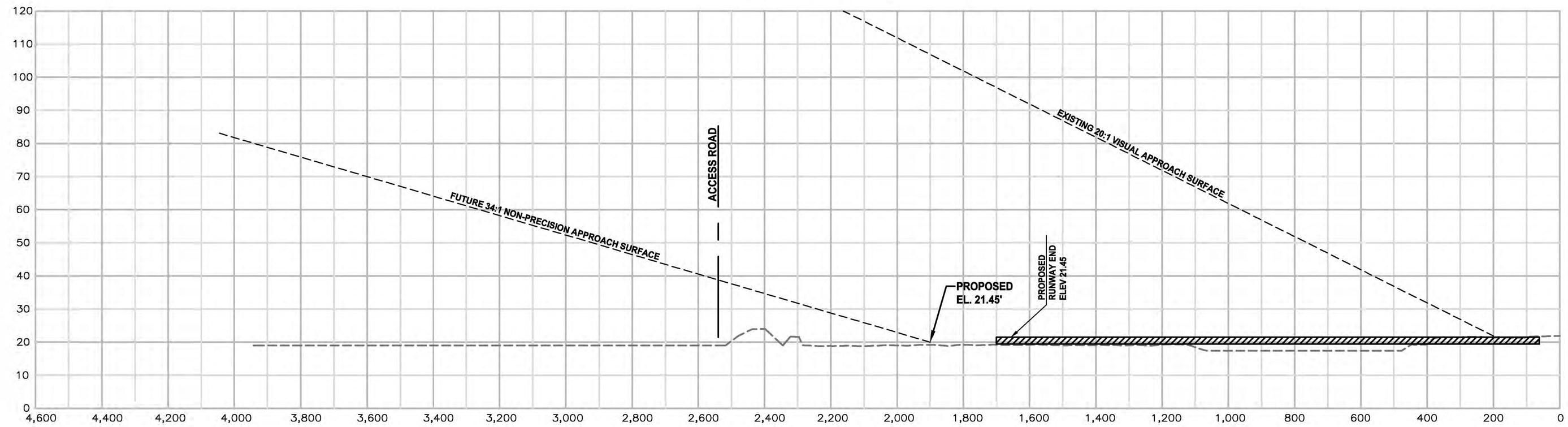
PRINT DATE
JUNE 2007

DEPT. OF AIRPORTS NO.
--

SHEET NO.
6 of 9



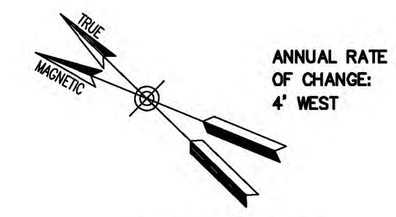
RUNWAY 13 PLAN VIEW



RUNWAY 13 PROFILE VIEW

PART 77 INNER SURFACE AIRPORT OBSTRUCTION TABLE
RUNWAY 13

OBSTRUCTION NO.	OBSTRUCTION TYPE	TOP OF OBJECT ELEV.	SURFACE PENETRATION	SURFACE	PROPOSED ACTION
NONE	N/A	N/A	N/A	N/A	N/A



MAGNETIC DECLINATION
5° 47' WEST (2006)

GRAPHIC SCALE (feet)

HORIZ. =	200	100	0	200	400	800
VERT. =	20	10	0	20	40	80

DEPARTMENT OF AIRPORTS
PALM BEACH COUNTY

CH2MHILL

REVISIONS

NO.	DATE	BY	DESCRIPTION	APP'D	NO.

PROJECT MGR: CIN	SCALE: AS SHOWN
PLANNER: CIN	DATE: JULY 2006
DRAWN BY: PIT	CHECKED BY: WPB

APPROVALS

Federal Aviation Administration

By: _____

Title: _____ Date

Case No: _____

Palm Beach County Department of Airports

By: _____
Jerry Allen

Title: _____
Director of Planning & Development Date

NORTH PALM BEACH COUNTY AIRPORT

RUNWAY 13 INNER APPROACH SURFACE

REVISION DATE

PRINT DATE
JUNE 2007

DEPT. OF AIRPORTS NO.
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SHEET NO.
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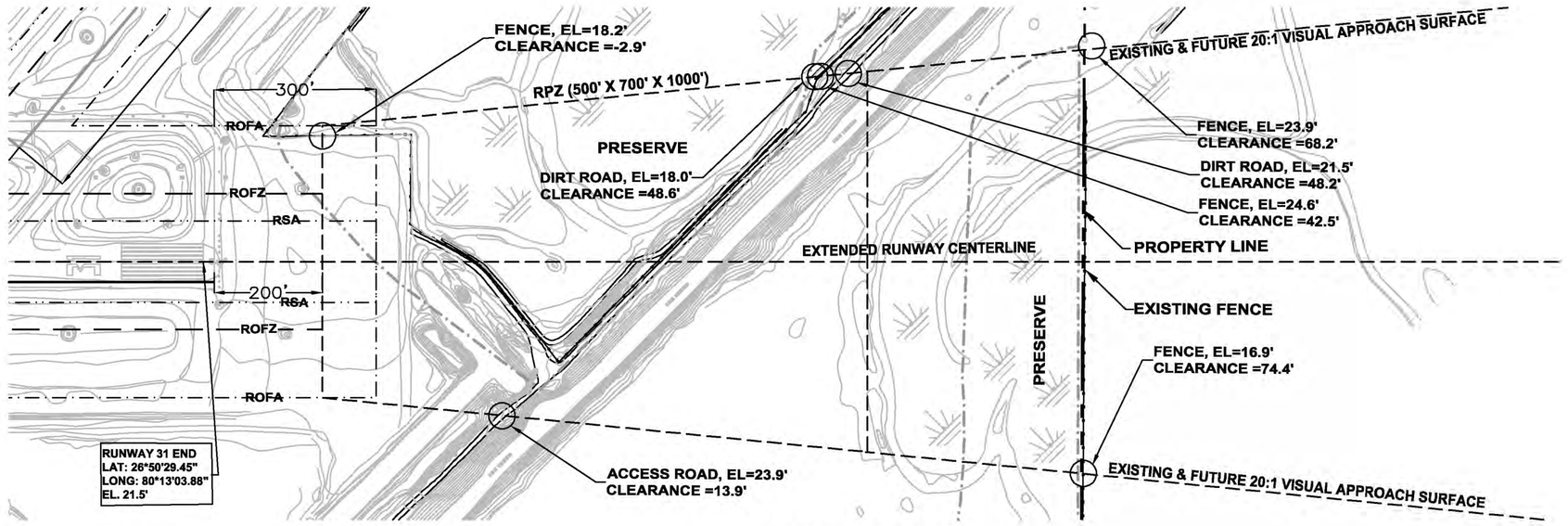
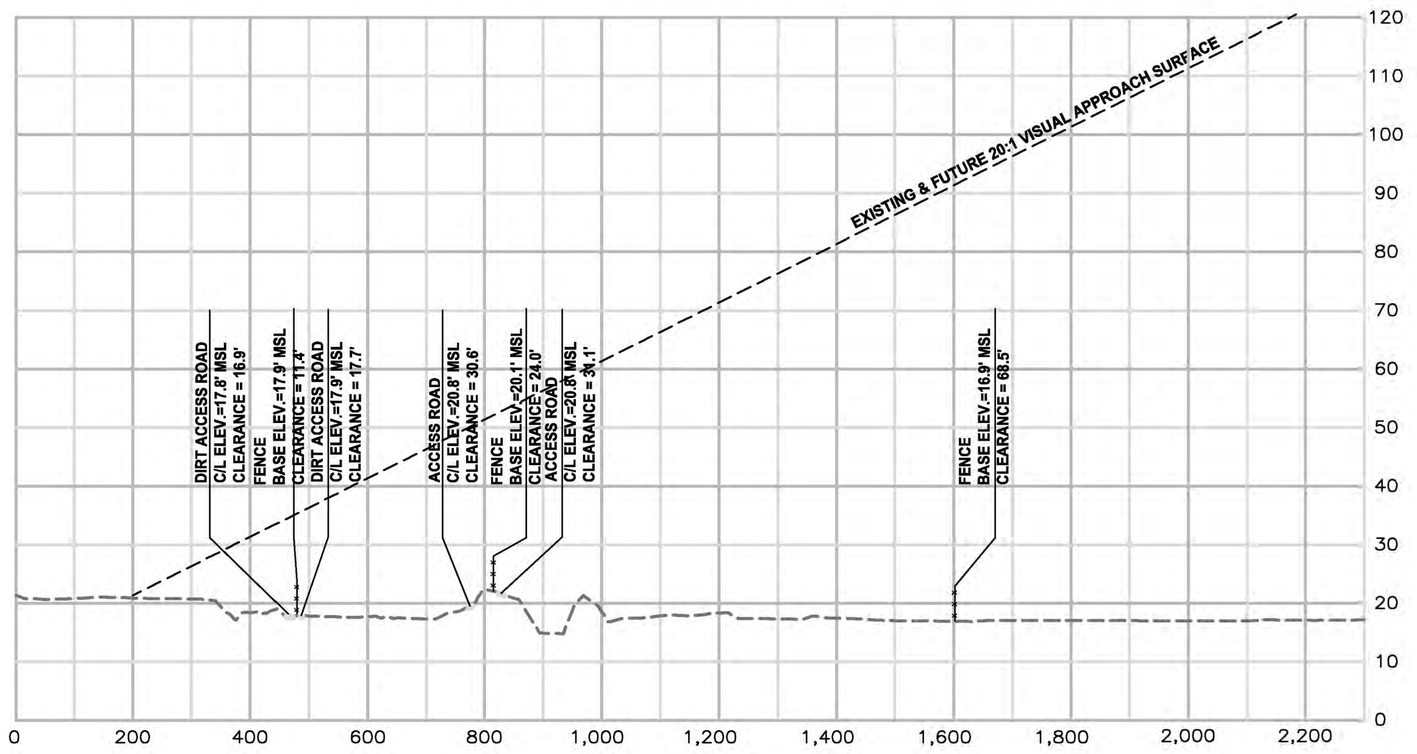


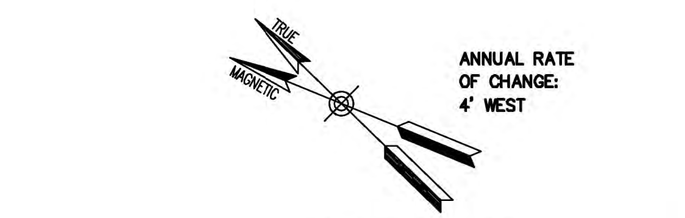
RUNWAY 31 PLAN VIEW



RUNWAY 31 PROFILE VIEW

PART 77 INNER SURFACE AIRPORT OBSTRUCTION TABLE
RUNWAY 13

OBSTRUCTION NO.	OBSTRUCTION TYPE	TOP OF OBJECT ELEV.	SURFACE PENETRATION	SURFACE	PROPOSED ACTION
NONE	N/A	N/A	N/A	N/A	N/A



MAGNETIC DECLINATION
5° 47' WEST (2006)

GRAPHIC SCALE (feet)

HORIZ. =	200	100	0	200	400	800
VERT. =	20	10	0	20	40	80

DEPARTMENT OF AIRPORTS
PALM BEACH COUNTY

CH2MHILL

REVISIONS

NO.	DATE	BY	APP'D	DESCRIPTION

PROJECT MGR: CIN	SCALE: AS SHOWN
PLANNER: CIN	DATE: JULY 2006
DRAWN BY: PIT	CHECKED BY: WPB

APPROVALS

Federal Aviation Administration

By: _____

Title: _____ Date

Case No: _____

Palm Beach County Department of Airports

By: _____
Jerry Allen

Title: _____
Director of Planning & Development Date

NORTH PALM BEACH COUNTY AIRPORT

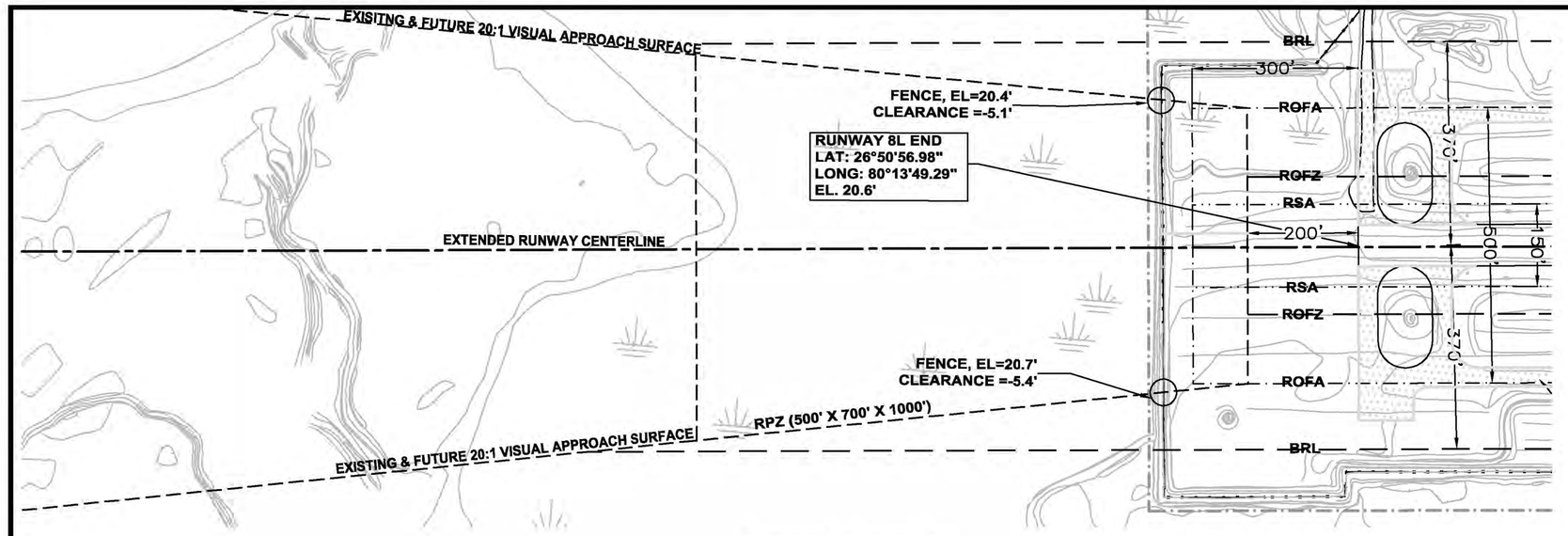
RUNWAY 31 INNER APPROACH SURFACE

REVISION DATE

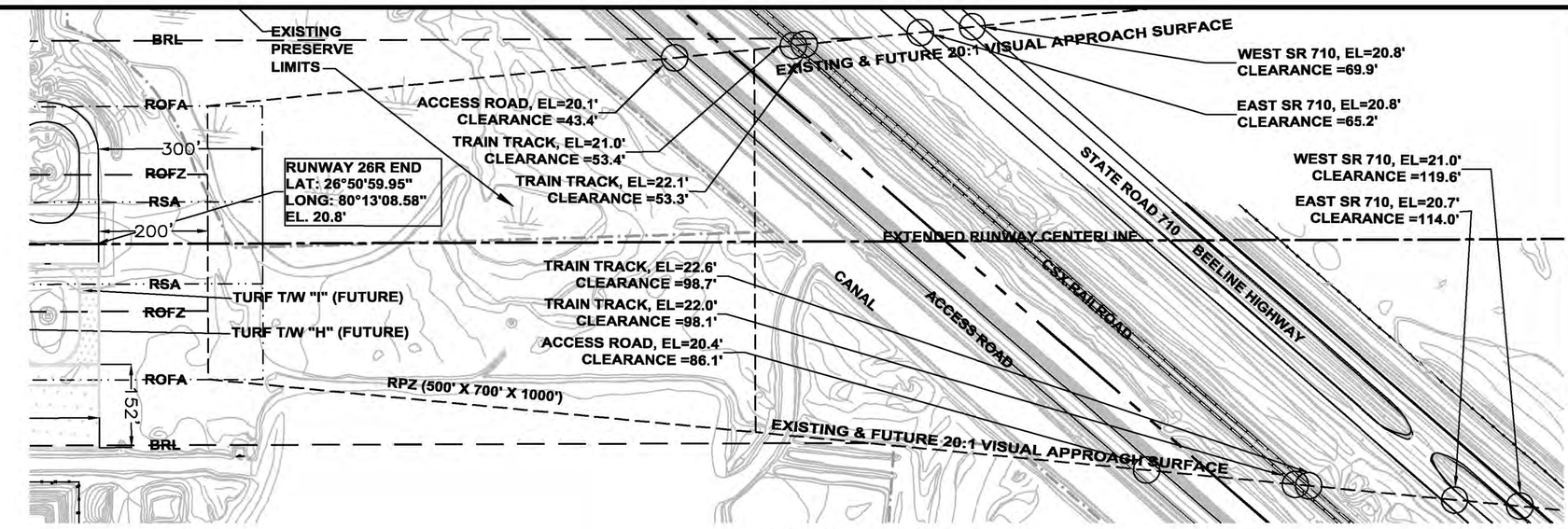
PRINT DATE: JUNE 2007

DEPT. OF AIRPORTS NO.: --

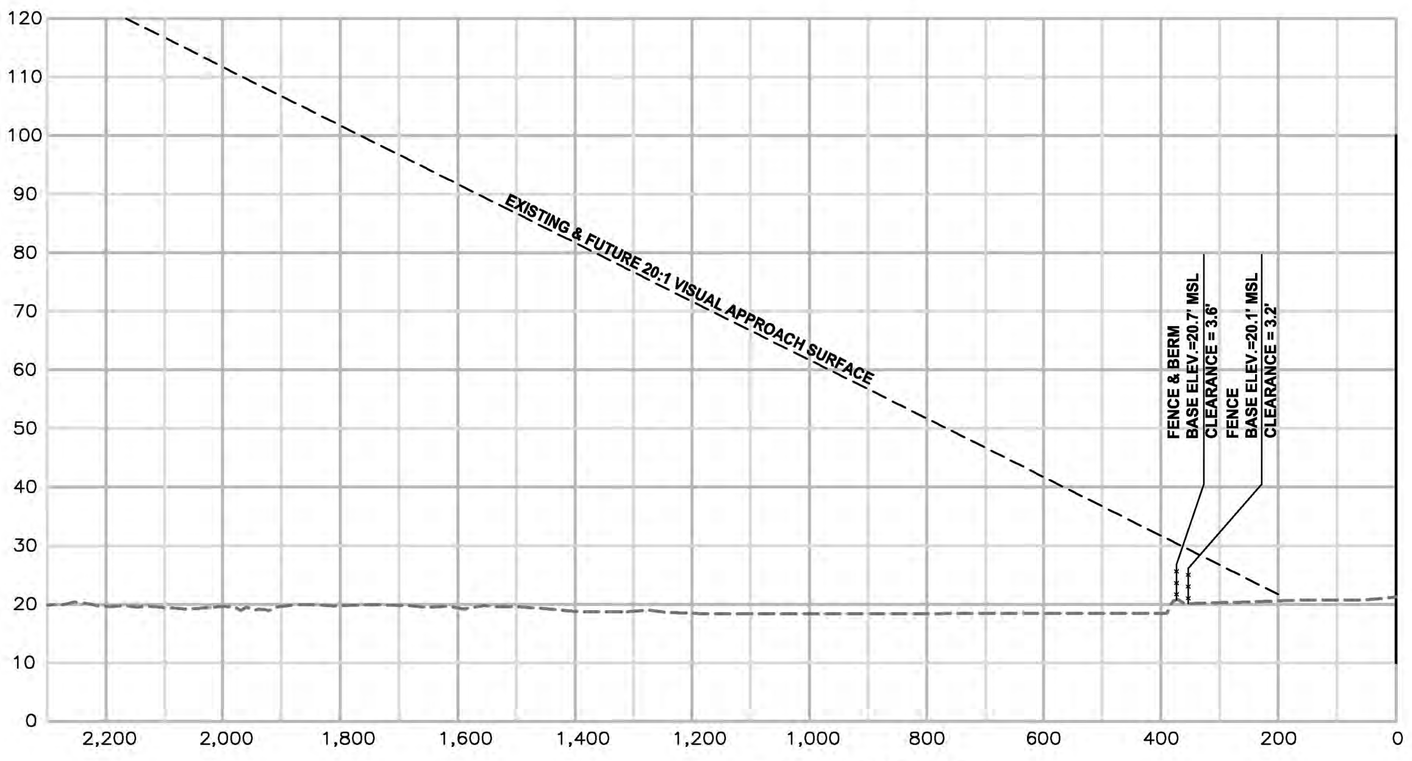
SHEET NO.: 8 of 9



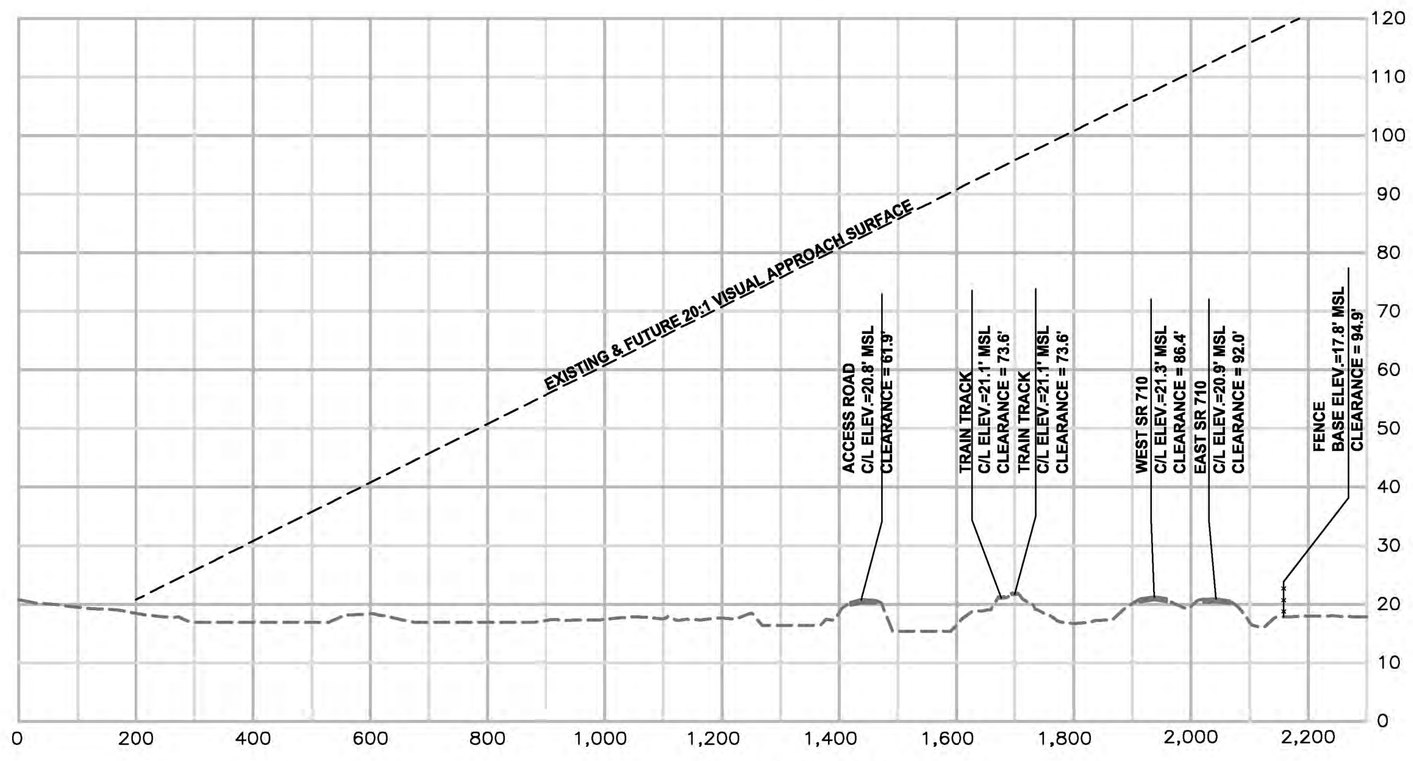
RUNWAY 8L PLAN VIEW



RUNWAY 26R PLAN VIEW



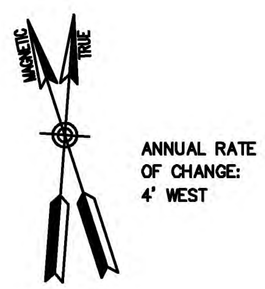
RUNWAY 8L PROFILE VIEW



RUNWAY 26R PROFILE VIEW

PART 77 INNER SURFACE AIRPORT OBSTRUCTION TABLE
RUNWAY 8L-26R

OBSTRUCTION NO.	OBSTRUCTION TYPE	TOP OF OBJECT ELEV.	SURFACE PENETRATION	SURFACE	PROPOSED ACTION
NONE	N/A	N/A	N/A	N/A	N/A



ANNUAL RATE OF CHANGE: 4' WEST

MAGNETIC DECLINATION
5° 47' WEST (2006)

GRAPHIC SCALE (feet)

HORIZ. =	200	100	0		200	400	800
VERT. =	20	10	0		20	40	80

DEPARTMENT OF AIRPORTS
PALM BEACH COUNTY

CH2MHILL

REVISIONS

NO.	DATE	BY	DESCRIPTION	APP'D

PROJECT MGR: CIN	SCALE: AS SHOWN
PLANNER: CIN	DATE: JULY 2006
DRAWN BY: PIT	CHECKED BY: WPB

APPROVALS

Federal Aviation Administration

By: _____

Title: _____ Date

Case No: _____

Palm Beach County Department of Airports

By: _____
Jerry Allen

Title: _____
Director of Planning & Development Date

NORTH PALM BEACH COUNTY AIRPORT

RUNWAY 8L & 26R INNER APPROACH SURFACE

REVISION DATE

PRINT DATE
JUNE 2007

DEPT. OF AIRPORTS NO.
--

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Appendix A

U.S. Department of Transportation
Federal Aviation Administration
Southern Region – Airports Division
Effective Date: May 2004

Airport Layout Plan Drawing Set Checklist

Name of Airport: North Palm Beach County Airport General Aviation (F45)
Location of Airport: Palm Beach County, Florida
Date of Review: _____ Reviewed by: _____

Significant Development Changes Since Previous ALP Approval / or Narrative

1. Construction of T-Hangars (Bldg. 11720, 11730, 11740, 11750)
2. Construction of Taxiway C
3. Construction of Taxilane F
4. _____
5. _____
6. _____

In order to protect the airspace for future conditions, complete the following information:

Future Airport Reference Point (ARP) **(if same as existing, provide existing ARP)**

ARP Latitude: 26 deg 50' 45.347", ARP Longitude: 80 deg 13' 20.442"

Future Rwy End Coordinates & Rwy End Elevation **(if same as existing, provide existing coordinates)**

Rwy End: 8R, Rwy End Latitude: 26d, 50', 33.09", Rwy End Longitude: 80d, 13', 36.69", Rwy End Elevation: 21.5'

Rwy End: 26L, Rwy End Latitude: 26d, 50', 36.54", Rwy End Longitude: 80d, 12', 49.38", Rwy End Elevation: 21.5'

Rwy End: 8L, Rwy End Latitude: 26d, 50', 56.98", Rwy End Longitude: 80d, 13', 49.29", Rwy End Elevation: 20.6'

Rwy End: 26R, Rwy End Latitude: 26d, 50', 59.95", Rwy End Longitude: 80d, 13', 08.58", Rwy End Elevation: 20.8'

Rwy End: 13, Rwy End Latitude: 26d, 51', 11.71", Rwy End Longitude: 80d, 13', 50.43", Rwy End Elevation: 21.45'

Rwy End: 31, Rwy End Latitude: 26d, 50', 29.45", Rwy End Longitude: 80d, 13', 03.88", Rwy End Elevation: 21.5'

Existing and Proposed Modification of Standards (MOS)

Existing Deviation of Standard/ FAA Approved MOS FAA Approval Date (if any) Expiration Date (if any)

1. N/A
2. _____
3. _____

Proposed Deviation of Standard/ FAA Modification of Standards

1. N/A
2. _____
3. _____

Runway Safety Area Re-Evaluations

(X) Concur with Runway Safety Area Determination currently on file with FAA.

( ) Reevaluation of Runway Safety Area Determination completed as part of planning document and shown on this ALP set.

Narrative Report	Yes	No	Comments
Report Provided	(X)	( )	
Aeronautical Forecasts			
- 0-5 yrs., 6-10 yrs., 10-20 yrs	(X)	( )	
-Total annual operations	(X)	( )	
- Annual itinerant operations	(X)	( )	
- Based aircraft	(X)	( )	
- Annual instrument approaches (if applicable)	( )	(X)	
- Annual itinerant operations by critical aircraft	( )	(X)	
- Annual itinerant ops by more demanding aircraft	( )	(X)	
Proposed Development Justification	(X)	( )	
Special Issues (MOS, etc.)	(X)	( )	
Development Schedule and Graphics	(X)	( )	
Proper Agency Coordination (sponsor, local, state)	(X)	( )	Department of Airports
Airport Layout Drawing			
Proper Agency Approval (Sponsor, Local, State)	(X)	( )	Department of Airports
Sheet Size - 24"x36"/ 22" x 34"	(X)	( )	
Scale 1"=200'-600'	(X)	( )	1" = 500'
2'-10' Labeled Contours	( )	(X)	
North Arrow			
- True & magnetic	(X)	( )	
- Declination w/ annual rate of change	(X)	( )	
Wind Rose			
- Source & time period	(X)	( )	
- MPH & knots	(X)	( )	
- 12 MPH individual & combined coverage	( )	(X)	
- 15 MPH individual & combined coverage	( )	(X)	
Airport Reference Point (ARP)			
- Existing w/ Lat./ Long. (NAD 83)	(X)	( )	
- Ultimate w/ Lat./ Long. (NAD 83)	(X)	( )	
Elevations (Existing & Ultimate)			
- Existing runway ends	(X)	( )	
- Displaced thresholds	(X)	( )	
- Ultimate runway ends	(X)	( )	
- Runway intersections	(X)	( )	
- Runway high & low points	(X)	( )	
- Touchdown zone elevation	(X)	( )	
(highest Rwy elevation in first 3,000' of any Rwy having published straight -in minima)			
Drawing Lines			
- Existing property boundary	(X)	( )	
- Ultimate property boundary	(X)	( )	
- Building restriction line (both sides)	(X)	( )	
- Existing development shown as solid	(X)	( )	
- Future development shown as dashed/ shaded	(X)	( )	

Airport Layout Drawing (Continued)	Yes	No	Comments
Runway Drawing Details (Existing & Ultimate)			
- Runway(s) Depiction	(X)	( )	
- Length & width	(X)	( )	
- End numbers	(X)	( )	
- True bearing (nearest sec.)	( )	(X)	Azimuth in Data Table
- Markings (basic, NPI, PIR)	(X)	( )	
- Lighting (thresholds only)	(X)	( )	
- Threshold lat/ long & elevations	(X)	( )	
- Displaced threshold lat/ long & elevations	(X)	( )	
- Runway safety areas & dimensions	(X)	( )	
- Runway object free areas & dimensions	(X)	( )	
- Runway obstacle free zones	(X)	( )	
- Centerline w/ true bearing	(X)	( )	Azimuth in Data Table
- Approach aids indicated (ILS, REILS, etc.)	(X)	( )	
- Lat/ long & elevation for non-federal on-airport NAVAIDs (used for instrument approach procedure)	( )	(X)	
Taxiway Details (Existing & Ultimate)			
- Taxiway widths	(X)	( )	
- Designations	(X)	( )	
- Separation dimensions to:			
Runway centerline(s)	(X)	( )	
Parallel taxiway(s)	(X)	( )	
Aircraft parking area(s)	(X)	( )	
Aircraft Parking Aprons			
- Existing & ultimate aprons shown	(X)	( )	
- Dimensions	(X)	( )	
- Tie-down layout/ locations	(X)	( )	
Runway Protection Zones (RPZs)			
- Existing & ultimate RPZs shown	(X)	( )	
- Dimensions	(X)	( )	
- Approach slope (20:1, 34:1, 50:1)	(X)	( )	
Title & Revision Blocks			
- Name and location of airport	(X)	( )	
- Name of preparer	(X)	( )	
- Date of drawing	(X)	( )	
- Drawing title	(X)	( )	
- Revision block			
- FAA disclaimer	(X)	( )	
- Sponsor approval block	(X)	( )	
Airport Data Block (Existing & Ultimate)			
- Airport elevation (MSL)	(X)	( )	
- Airport Reference Point (ARP) Data	(X)	( )	
- Airport & terminal NAVAIDS (beacon, ILS)	(X)	( )	
- Mean maximum temperature	(X)	( )	
- Airport Reference Code (ARC) for each runway	(X)	( )	
- Design Aircraft for each runway	(X)	( )	
- Identify GPS at airport	(X)	( )	

Airport Layout Drawing (Continued)	Yes	No	Comments
Runway Data Block (Existing & Ultimate)			
- % effective gradient	(X)	( )	
- % wind coverage (MPH & knots)	( )	(X)	
- Maximum elevation above MSL	( )	(X)	Shown on Plan
- Runway length	(X)	( )	
- Runway width	(X)	( )	
- Runway surface type (turf, asphalt…)	(X)	( )	
- Runway strength (SWG, DWG…)	(X)	( )	
- Part 77 approach category (visual, NPI, PIR)	(X)	( )	
- Type instrument approach (ILS, GPS…)	(X)	( )	
- Approach slope (20:1, 34:1, 50:1)	(X)	( )	
- Runway lighting (HIRL, MIRL, LIRL)	(X)	( )	
- Runway marking (PIR, NPI, BCS)	(X)	( )	
- NAVAIDS & visual aids	(X)	( )	
- Runway safety area dimensions (standard & non-standard)	(X)	( )	
Miscellaneous			
- Airport facility/ building list (existing & future)	(X)	( )	
- Standard legend	(X)	( )	
- Location map	(X)	( )	
- Vicinity map	(X)	( )	
- Roadways, traverse ways identified	(X)	( )	

Additional Comments:

Airport Airspace Drawing			
Ultimate Runway Length Plan View of Surfaces	(X)	( )	
Profile View of Ultimate Runway Lengths	(X)	( )	
Obstruction Data Tables	(X)	( )	
Sheet Size Same as ALP	(X)	( )	
Plan View Scale 1"=2000'	( )	(X)	1" = 2500'
Profile View Scale 1"=1000' Horizontal, 1"=100' Vertical	( )	(X)	2" = 200'H = 20' V
Title & Revision Blocks	(X)	( )	
Approach Plan View Details			
- USGS base map	(X)	( )	
- Runway end numbers shown	(X)	( )	
- Elevation contours of 50' on all slopes	( )	(X)	100' and Surface Elevations
- Show most demanding surface lines as solid and others as dashed	(X)	( )	
- Identify penetrating objects & top elevations (for those in inner approach add note, "Refer to the inner portion of the approach surface plan view details for close-in obstructions.")	(X)	( )	
- Show PIR approach of 50,000 on separate sheet as necessary	(X)	( )	Shown on Same Sheet
- Note any height restriction zoning/ ordinances/ statutes in place	(X)	( )	
Approach Profile View Details			
- Ground profile along extended centerline (highest profile elevations of width & length of approach)	(X)	( )	
- Identify significant objects (roads, rivers, etc.) w/ elevations	(X)	( )	
- Existing & ultimate runway ends and approach slopes	(X)	( )	

Additional Comments:

Inner Portion of the Approach Surface Drawing	Yes	No	Comments
Large-Scale Plan View for Each Runway End (up to 100' height above runway end)	(X)	( )	
Large-Scale Profile View for Each Runway End (up to 100' height above runway end)	(X)	( )	
Sheet Size	(X)	( )	
Scale 1"=200' Horizontal, 1"=20' Vertical	(X)	( )	
Title & Revision Blocks	(X)	( )	
Separate Approach Tables with Obstruction Data			
- Type of approach (NPI, etc.)	(X)	( )	
- Approach Slope (20:1, etc.)	(X)	( )	
- Obstruction number	(X)	( )	
- Obstruction description	(X)	( )	
- Approach penetration (in feet)	(X)	( )	
- Proposed mitigation (including "none.")	(X)	( )	
Inner Approach Plan View Details			
- Aerial photo base map	( )	(X)	
- Obstructions numbered	(X)	( )	
- Property line depicted	(X)	( )	
- Identify by numbers all traverse ways w/ elevations & vertical clearances in approach (At approach edge & extended centerline)	(X)	( )	
- Depict existing & ultimate runway ends	(X)	( )	
- Ground contours shown	( )	(X)	Minimal Grade Change
Inner Approach Profile View Details			
- Identify significant terrain/ items in RSA	(X)	( )	
- Identify obstructions with numbers on plan view	(X)	( )	
- Depict roads and railroads at edge of approach as dashed	(X)	( )	

Additional Comments:

Terminal Area Drawing			
Large-Scale Plan View of Terminal/ GA Area(s) as Needed	(X)	( )	
Show Existing & Future Buildings	(X)	( )	
Sheet Size Same as ALP	(X)	( )	
Scale 1"=50'-100'	( )	(X)	1" = 200'
Title & Revision Bocks	(X)	( )	
Legend	(X)	( )	
Building Data Table (Existing & Ultimate)			
- Number facilities	(X)	( )	
- Include top elevations	(X)	( )	
- Identify obstruction marking	(X)	( )	

Additional Comments:

Land Use Drawing (Existing & Ultimate)

	Yes	No	Comments
- Basic airport features/ surfaces	( )	(X)	
- Property lines	( )	(X)	
- Include all land uses (industrial, residential, etc.) on & off airport (including non-aeronautical) to minimum 65 LDN	( )	(X)	
- Line of sight or runway visibility zones shown	( )	(X)	
- Note any existing land use ordinances/ statutes in place	( )	(X)	
- Noise contours as required in scope of work (60, 65 & 70 LDN)	( )	(X)	
- Sheet size same as ALP	( )	(X)	
- Scale same as ALP	( )	(X)	
- Title & revision block	( )	(X)	
- Aerial base map	( )	(X)	
- Legend (symbols and land use descriptions)	( )	(X)	
- Identify recommended land use changes	( )	(X)	
- Identify public facilities (schools, parks, etc.)	( )	(X)	

Additional Comments:

Airport Property Map (Existing & Ultimate)

Property Lines (Clear & Bold)	( )	(X)	
RPZ's Shown	( )	(X)	
Tracts of Land on and off Airport	( )	(X)	
Sheet Size Same as ALP	( )	(X)	
Scale Same as ALP	( )	(X)	
Title & Revision Block	( )	(X)	
Legend	( )	(X)	
Airport Features (expansion, etc.)/ Critical Surfaces (RSA's, etc.) Shown (to aid in determining eligible land needs)	( )	(X)	
Data Table			
- Numbering system for parcels	( )	(X)	
- Date of acquisition	( )	(X)	
- Federal aid project number	( )	(X)	
- Type of ownership (fee, easement, federal surplus, etc.)	( )	(X)	
- Parcel acreage	( )	(X)	

Additional Comments:

Report

North County Airport Development Plan

The second of several reports that will comprise the Airport's Master Plan

Prepared for

Palm Beach County Department of Airports

October 2005

CH2MHILL
1 Harvard Circle
West Palm Beach, Florida

Contents

Contents, Continued

Section **Page**

Exhibits

Executive Summary

This is the second report of several that will together comprise the Master Plan for the Airport. The first report is the *North County Airport Aviation Activity Forecast*. Given the increase in aircraft traffic reported and projected for the North County General Aviation Airport (NCO), the County's Department of Airports (DOA) must provide facilities that safely accommodate existing and forecast aircraft fleet mix, while responding to changing user needs. Aircraft activity at NCO has increased over the years, in part because the existing general aviation facilities at Palm Beach International Airport (PBI) and at Palm Beach County Airpark (LNA) are reaching capacity, and increased congestion at PBI. This situation, along with a new emphasis on the area around NCO as a center for economic growth in Palm Beach County and southeast Florida, results in activity growth and shifting to NCO. The planned development of the Scripps Research Institute (TSRI), which is a key contributor to the development of this new center for high-technology activities, will have a direct impact on Airport activities, bringing both new opportunities and potential requirements for NCO. Based aircraft are expected to increase from 215 in 2004 to 329 in 2025 and aircraft operations are projected to reach 110,844 by 2025, increasing at an average annual rate of 2.28 percent. Additionally, NCO has begun to experience an increase in operational activity by light business jet aircraft (including the basing of seven business jet aircraft at the facility) despite the relatively limited runway length currently provided at NCO.

Changes in the aviation industry also contribute to changes that must be considered in airport facility planning. Over the past years, several developments have led to greater sophistication of the general aviation aircraft fleet mix. Aircraft avionics, for instance, have significantly improved, reducing pilot tasks and facilitating aircraft flying activities. Development of composite airframes and new engine technologies has led to the emergence of lighter aircraft, offering better performance and reliability. Many of these aircraft technology changes have been key contributing factors to the emergence of a new class of business jets that, as of late 2005, is just beginning to enter the market. Smaller and lower cost variants of this aircraft type, known as the very light jet (VLJ), are being produced by a number of manufacturers and starting in 2006 are anticipated to open jet operations to an array of new markets and potential users.

In view of these transformations, the Palm Beach County DOA recognized that the changes occurring both locally and in the aviation industry called for the re-evaluation of previous planning studies with an eye toward development of a long-term plan for the Airport in order to maintain a quality airport facility that addresses projected demand and also provides stimulus for ongoing economic development activities by the county. This long-term plan is intended to examine airfield capacity and capabilities, identify possible shortfall, and determine the Federal Aviation Administration (FAA) airport design criteria and standards to be followed to meet the current and projected demand. While this plan is an important component of the DOA's long-term vision for the Airport, it does not provide automatic approval for any major development on the airport site that may be recommended. Before proposed development may proceed, environmental and financial reviews and approval will be needed.

This long-term plan will be composed of several technical reports focusing on various aspects of the airport. This report focuses only on airfield capacity, determination of the Airport Reference

Code (ARC), and an analysis of runway length requirements and airfield development alternatives. The third technical report, which will be developed in Phase II of the System Wide Airport Master Planning Study, will examine the remainder of the Airport facilities.

Airfield Demand/Capacity

The purpose of this Airfield Demand/Capacity analysis is to determine the capability of the NCO to meet the forecast of operational use over the planning period. The calculated capacity is compared to the forecast operational demand from the Aviation Activity Forecasts to determine whether the airfield configuration will adequately meet those demands without creating unacceptable delays for airport users.

This analysis clearly identifies that the Airport's existing runway system will not experience a capacity deficiency over the course of the planning period, given current forecasts of future activity levels.

Airport Reference Code

The selection of an ARC is based on the review of the existing and projected aircraft fleet mix identified in the forecasts at NCO. The aviation activity forecasts identified that light to midsize business jet aircraft are expected to regularly operate at the Airport over the planning period. These aircraft will all be within Aircraft Design Group II (wingspans of between 49 and 79 feet) and have approach speeds of up to 141 knots, which would place these aircraft within Approach Category C. These two parameters combined result in an ARC of C-II, which is required to fully accommodate this grouping of aircraft. Because all runways at NCO currently meet B-II standards, at least one of these runways and, in this case, the crosswind runway is recommended for improvement in order to comply with the design requirements associated with C-II standards. Compliance with C-II standards requires, among other things, grading and clearing of a larger runway safety area (RSA), the possible widening of the runway, and the clearing and protection of larger runway protection zones (RPZ).

Runway Length Requirements

Based on the study of runway length requirements for the grouping of light and midsize business jet aircraft forecast to regularly use the Airport (the design aircraft), a recommendation is made to extend one runway at NCO to a length of 6,000 feet to better accommodate this activity. (Design aircraft, or family of aircraft, is one that currently conducts or is forecasted to conduct at least 500 annual itinerant operations at the airport.)

Runway Development Alternatives

In light of the constraints, including natural areas and roadways, that can potentially limit the expansion of the airfield, a couple of alternatives have been developed. These alternatives consider the proposed alignments of the extension of PGA Boulevard, which is expected to run south of the Airport property. Advantages and weaknesses of each of the alternatives are discussed. Based on the runway length requirements that have been established in this study, and in view of the local constraints, the extension of Runway 13-31 by 1,700 feet to the northwest is recommended. In this preferred alternative, the Runway 31 threshold remains in

place and the extension of PGA Boulevard bows around the Airport property without encroaching upon it.

SECTION 1

Introduction

In view of the recent and projected growth in the area of the North County General Aviation Airport (NCO), the Palm Beach County Department of Airport (DOA) decided to review and refine the long-term development for the Airport. This second report (as a component of the Airport's Master Plan) focuses on a review of the existing runway system and identifies future needs.

Section 2 of this report compares the forecast of annual aircraft operations to airfield capacity. Although airfield capacity is not expected to be an issue in the short and long term, airfield improvements may be required for NCO to improve its operational capacity.

Following the airfield capacity analysis, runway requirements, including the identification of the future Airport Reference Code (ARC), critical aircraft, runway width, pavement strength, and takeoff runway length requirements are analyzed and defined in Section 3.

Finally, Section 4 presents a review of runway development alternatives and identifies the recommended preferred alternative. Most importantly, this section identifies both the natural environmental and manmade constraints that could potentially limit the airport expansion, including the proposed alignment of the extension of PGA Boulevard.

To summarize, this report is broken down in three different sections that include:

- Airfield Demand/Capacity Analysis – Section 2
- Runway Requirements – Section 3
- Runway Development Alternatives – Section 4

SECTION 2

Airfield Demand/Capacity Analysis

The purpose of this Airfield Demand/Capacity Analysis is to determine the capability of the NCO to meet the forecast of operational use over the planning period. The calculated capacity will be compared to the forecast operational demand from the Aviation Activity Forecasts to determine whether the airfield configuration will adequately meet those demands without creating unacceptable delays for airport users. The airfield analysis will be expressed in terms of the hourly capacity and the annual service volume. Specific recommendations to address an identified capacity shortfall, if any, and recommended improvements to increase the current airfield capacity will be addressed at the end of this section.

2.1 Airfield Characteristics

Methods for determining airport capacity and delay are detailed in Federal Aviation Administration (FAA) AC 150/5060-5, Change 2, Airport Capacity and Delay. The methodology detailed in the advisory circular uses several key factors to determine the operational capacity of an airfield, including:

- Runway Configuration
- Aircraft Mix Index
- Taxiway Configuration
- Airfield Operational Characteristics
- Meteorological Conditions

Each of these factors has differing impacts on the capacity by setting certain limits on how aircraft can operate on the airfield system. This airfield capacity analysis addresses what is considered a typical day of operations at NCO. The following text discusses each of these capacity-related characteristics as they relate to the airfield facilities at NCO.

2.1.1 Runway Configuration

The layout of the airfield refers to the arrangement and interaction of the airfield components, which include the runway system, taxiways, and ramp entrances. NCO is composed of a three-runway system. Two of the runways, Runways 8L-26R and 8R-26L, are parallel to one another and are oriented in a general east-west direction. The two runways have a centerline-to-centerline separation distance of 2,500 feet. Runway 8R-26L is 4,300 feet long and 100 feet wide, constructed of asphalt pavement, and equipped with high intensity runway lights (HIRL). Because of its precision approach capability it is generally considered the primary runway at NCO. Runway 8L-26R is a turf runway devoted to small aircraft operations and is 3,700 feet long and 75 feet wide. Because of the northwest-southeast alignment of the Bee Line Highway (State Road 710), the turf runway is sited with a westward stagger, when compared to the alignment of Runway 8L-26R.

The third runway, designated as Runway 13-31, is oriented in a northeast-southwest direction and is 4,300 feet long and 75 feet wide. Runway 13-31 is equipped with Medium Intensity

Runway Lights (MIRL), is constructed of asphalt, and has a pavement strength rating of 30,000 pounds single-wheel loading. This runway is also equipped with Runway End Identifier Lights (REIL); however, these lights are not currently operational.

The airport's existing landside facilities are located to the east of Runway 13-31, primarily between the alignments of the two parallel runways, and include a Fixed Base Operation (FBO) terminal facility, hangars, and aircraft parking aprons and tie-down areas. These facilities are centrally located on the airfield and well suited to use the existing taxiway system. A second cluster of T-hangars has been developed along the north side of the turf runway to the east of Runway 13-31.

2.1.2 Aircraft Fleet Mix Index

The operational aircraft fleet at an airport influences an airfield's capacity based on differing aircraft spacing requirements, both vertically and horizontally. The in-flight aircraft spacing requirements that have been established by the FAA are intended to enhance the safety of aircraft operations. On approaches and departures, one of the more significant concerns is associated with the wake turbulence forces, or vortices, that trail behind a plane. The vortex originates at the aircraft wingtip and can best be visualized as horizontal tornados coming off of the wings. If there is not enough time allowed between aircraft operations for the vortices to dissipate before a second aircraft lands or departs, the second aircraft can become unstable. This becomes more critical as small general aviation and larger models of business jets operate on the same runway.

Another way the aircraft fleet influences the airfield's capacity is the time needed for the aircraft to clear the runway, either upon arrival or departure. As aircraft size and weight increases, so does the time needed for it to slow to a safe taxiing speed or to achieve the needed speed for takeoff. Therefore, a larger aircraft generally requires more runway occupancy time than a smaller aircraft would. This issue is more applicable to commercial service airports having a significant amount of general aviation activity rather than having a significant adverse influence at an airport such as NCO, where even jet operations are by smaller aircraft models.

FAA AC 150/5060-5 defines four classes of aircraft used for capacity determinations. Therefore, the operational fleet at an airport is determined by the relative percentage of operations conducted by each of the four classes of aircraft. As identified in Exhibit 2-1, this classification is based on the maximum certificated takeoff weight of the aircraft, the number of engines, and the wake turbulence classifications.

EXHIBIT 2-1
Aircraft Classifications for Airport Capacity Determination

Aircraft Class	Maximum Certified Takeoff Weight (lbs)	Number of Engines	Wake Turbulence Classification
A	12,500 or less	Single	Small (S)
B	12,500 or less	Multi	Small (S)
C	12,500 to 300,000	Multi	Large (L)
D	More than 300,000	Multi	Heavy (H)

Source: FAA Advisory Circular (AC) 150/5060-5, Change 2, Airport Capacity and Delay.
Prepared by Ricondo & Associates, Inc.

This aircraft classification is used to calculate the aircraft mix index, which is a mathematical expression used as one of the inputs to calculate airfield capacity. The formula for finding the mix index is the identification of the percentage of category C aircraft plus three times the percentage of category D aircraft [%(C + 3D)]. The percent of A and B class aircraft is not considered because the wake turbulence generated by these small aircraft dissipates fairly rapidly allowing other aircraft to be spaced closer to Class A and B aircraft than to a C or D class aircraft. At NCO, the current aircraft mix includes primarily Class A and B aircraft, with occasional operations by aircraft over 12,500 pounds (Class C). Because no Class D aircraft operate into and out of the Airport, nor are they forecast to do so over the planning period, the mix index for the Airport is equivalent to the percent of annual operations by Class C aircraft.

Currently, not enough Class C aircraft operate at the Airport to be considered significant; however, for planning purposes, it is considered reasonable to assume that by 2025, 10 percent of the future jet aircraft in the operational fleet mix will be Class C aircraft. This assumption is derived from the fact that more than 40 percent of the jet aircraft that currently operate at PBI fall within the C category and it is assumed that some of these aircraft will relocate to NCO.[1]

Using the FAA formula, the aircraft mix index will simply increase to 10 percent by the year 2025 from the Airport's current index of zero. As the aircraft mix index rises, the capacity of the airfield to accommodate aircraft operations decreases, albeit the extent of decrease is often limited. Given the low level of Class C aircraft at NCO, the decrease in the overall capacity at the airport will be insignificant.

2.1.3 Taxiway Configuration

The distance an aircraft has to travel to an exit taxiway after landing also sets limits on the airfield capacity because the longer an aircraft is on the active runway, the longer that runway is unavailable for another aircraft operation. If taxiways are placed at the approximate location where the aircraft would reach safe taxiing speed, the aircraft can exit and clear the runway for another user. However, if the taxiway is spaced either too close or too far from the touchdown zone, the aircraft will likely spend more time on the runway than if the taxiway had been in the optimum zone. Although pilot technique also contributes, the FAA has determined optimal distances to exit taxiways based on the mix index (see Exhibit 2-2).

EXHIBIT 2-2
Optimum Taxiway Exit Distance

Mix Index	Minimum Distance from Threshold (ft)	Maximum Distance from Threshold (ft)
0 to 20	2,000	4,000
21 to 50	3,000	5,500
51 to 80	3,500	6,500
81 to 120	5,000	7,000
121 to 180	5,500	7,000

Source: FAA AC 1505060-5, Change 2, Airport Capacity and Delay.
Prepared by Ricondo & Associates, Inc.

[1] Source: PBI Operations Report- 3/14/05- 3/20/05- All Operations except Commercial.

Several taxiway connectors/exits serve the three runways at NCO. There are 8 taxiway exits that connect Runway 8R-26L (assuming Runway 13-31 is not used as a runway exit) to Taxiway K on its north side. Runway 13-31 is served by 7 exits located east of the runway alignment nearest existing airport facilities, and, finally, Runway 8L-26R features 12 exits that are uniformly positioned on both sides of the turf runway alignment. Based on FAA criteria, the exit factor at NCO is maximized when the runways have exit taxiways between 2,000 and 4,000 feet from the runway ends. Using this criterion, Runway 8R has three exits, Runway 26L two exits, Runway 13 three exits, Runway 31 two exits, Runway 8L three exits, and Runway 26R three exits within the optimum range. Thus, the exit factors for each of the runways at NCO are positioned to maximize operational efficiency.

2.1.4 Airfield Operational Characteristics

The operational characteristics of airport activity that can affect an airfield's overall capacity include the percentage of aircraft arrivals, the sequencing of aircraft departures, and the percentage of touch-and-go operations.

2.1.4.1 Percentage of Aircraft Arrivals

The percentage of aircraft arrivals is the ratio of landing operations to the total operations of the airport. This percentage is considered because aircraft approaching an airport for landing essentially limit the availability of the runway for other operations for a longer period of time than an aircraft departing the airfield. The FAA methodology used in this analysis provides for computing airfield capacity with a figure of 40, 50, or 60 percent of aircraft arrivals.

The 40 and 60 percent figures result in an average ASV variance of ±11 percent when compared to the 50 percent level, with the lower percentage (40) having the highest capacity. For general planning purposes, the 50 percent arrival value was used as an average or neutral effect to determine the overall capacity at NCO.

2.1.4.2 Percentage of Touch-and-Go Operations

Touch-and-go operations are defined as operations by a single aircraft that lands and departs on a runway without stopping or exiting the runway. Pilots conducting touch-and-go operations usually stay in an airport's traffic pattern. As indicated in the Aviation Activity Forecasts, it is estimated that touch-and-go operations currently account for approximately 32 percent of total annual operations at NCO and this percentage was carried forward over the course of the 20-year planning period.

2.1.5 Meteorological Conditions

Aircraft operations are also influenced by weather conditions, such as the cloud ceiling height and visibility range on and near the airfield and by the prevailing winds in the airport area, which act to dictate the direction of runway use for arrivals and departures, particularly at an airport such as NCO that has a high percentage of smaller general aviation aircraft.

2.1.5.1 Wind Data

Wind conditions generally determine the desired alignment and configuration of the runway system. Wind conditions affect all airplanes to some degree; however, the ability to land and take off in crosswind conditions varies according to pilot proficiency and aircraft type.

Generally, the smaller the aircraft, the more it is adversely affected by the crosswind component. Aircraft operating from an airport generally take off and land into the wind to maximize lift as well as to reduce takeoff and landing ground-roll length. The FAA recommends that sufficient runways be provided to achieve at least 95 percent wind coverage, calculated by using:

- 10.5-knot crosswind component for the smaller light aircraft including those in ARC A-I and B-I
- 13-knot crosswind component for aircraft in ARC A-II and B-II
- 16-knot and 20-knot crosswind components for the larger aircraft or aircraft having higher approach speeds including those in approach category C

FAA Advisory Circular (AC) 150/5300-13, Change 9, Airport Design, requires that a period of at least 10 consecutive years be examined for determining the wind coverage when carrying out an evaluation of airfield wind coverage. Because there is no weather station located at NCO, hourly wind observations from January 1995 through December 2004 were obtained for the PBI airport. PBI is located 12 nautical miles southeast of NCO, so wind patterns are similar at both airports. Historical wind data were obtained from the National Climatic Data Center (NCDC).

To determine the wind coverage at NCO, the current runways were evaluated both independently and together. **Exhibit 2-3** summarizes the percent of wind coverage for the various runway configurations under three general weather categories, based on the height of the clouds above ground level (AGL) and horizontal visibility. These categories are:

- **All Weather Conditions**: include all weather observations.
- **Visual Flight Rule (VFR) Conditions**: Cloud ceiling is greater than 1,000 feet AGL and the visibility is at least 3 statute miles. All airports are able to operate under these conditions.
- **Instrument Flight Rule (IFR) Conditions**: Cloud ceiling is at least 500 AGL, but less than 1,000 feet AGL, and/or the visibility is less than 3 statute miles, but more than 1 statute mile. Aircraft operations are limited if the aircraft and the airport are not equipped with the proper instrument facilities.

As indicated in Exhibit 2-3, the current three-runway configuration at NCO provides nearly 100 percent coverage for all wind velocities under all-weather and VFR conditions. Even though the runway system does not provide the FAA recommended 95 percent wind coverage when considering a 10.5-knot crosswind component under IFR conditions, instrument weather conditions occur only a small percentage of the time at NCO. These crosswind components would affect only a small number of flight operations at the Airport. Therefore, it is not recommended that an additional runway be considered from a wind coverage standpoint under IFR conditions. Finally, because the runway system provides excellent wind coverage, the extremely limited period of IFR weather when wind conditions would not be met for the smallest aircraft in the fleet are not expected to significantly affect the overall capacity of the airfield.

From the data listed in Exhibit 2-3, it can also be determined that Runways 8 and 13 provide better wind coverage for each crosswind component. Exhibit 2-4 illustrates the percentage of wind observations by direction during all-weather conditions and underscores the wind coverage of Runways 8 and 13 by showing the wind blowing predominantly from the east and southeast.

EXHIBIT 2-3
Percentage Wind Coverage

Airfield Configuration	Crosswind Component			
	10.5 knots (12 mph)	13 knots (15 mph)	16 knots (18.4 mph)	20 knots (23.0 mph)
All-Weather Conditions				
Runway 8	61.6%	65.0%	66.3%	66.5%
Runway 26	42.0%	43.5%	43.9%	44.0%
Runway 8-26	92.9%	97.8%	99.5%	99.9%
Runway 13	61.8%	66.0%	67.7%	68.2%
Runway 31	39.9%	41.5%	42.2%	42.4%
Runway 13-31	91.1%	96.8%	99.2%	99.9%
All Runways	97.9%	98.4%	99.9%	100.0%
VFR Conditions (Ceiling > 1000 feet; Visibility > 3 statute miles)				
Runway 8	61.9%	65.3%	66.6%	66.9%
Runway 26	41.7%	43.2%	43.6%	43.7%
Runway 8-26	93.0%	97.8%	99.6%	99.9%
Runway 13	62.2%	66.3%	68.0%	68.5%
Runway 31	39.6%	41.2%	41.9%	42.1%
Runway 13-31	91.1%	96.9%	99.3%	99.9%
All Runways	98.0%	99.6%	99.9%	100.0%
IFR Conditions (Ceiling between 250 and 1,000 feet; visibility between 0.75 and 3.0 statute miles)				
Runway 8	31.7%	34.3%	36.0%	36.9%
Runway 26	63.3%	67.1%	68.9%	69.9%
Runway 8-26	84.9%	91.3%	94.8%	96.7%
Runway 13	35.1%	38.2%	39.8%	41.3%
Runway 31	62.4%	64.5%	65.8%	66.3%
Runway 13-31	87.4%	92.6%	95.6%	97.6%
All Runways	92.5%	96.5%	97.6%	98.7%

Source: National Climatic Data Center hourly observations, January 1, 1995, to December 31, 2004.
Prepared by Ricondo & Associates, Inc.

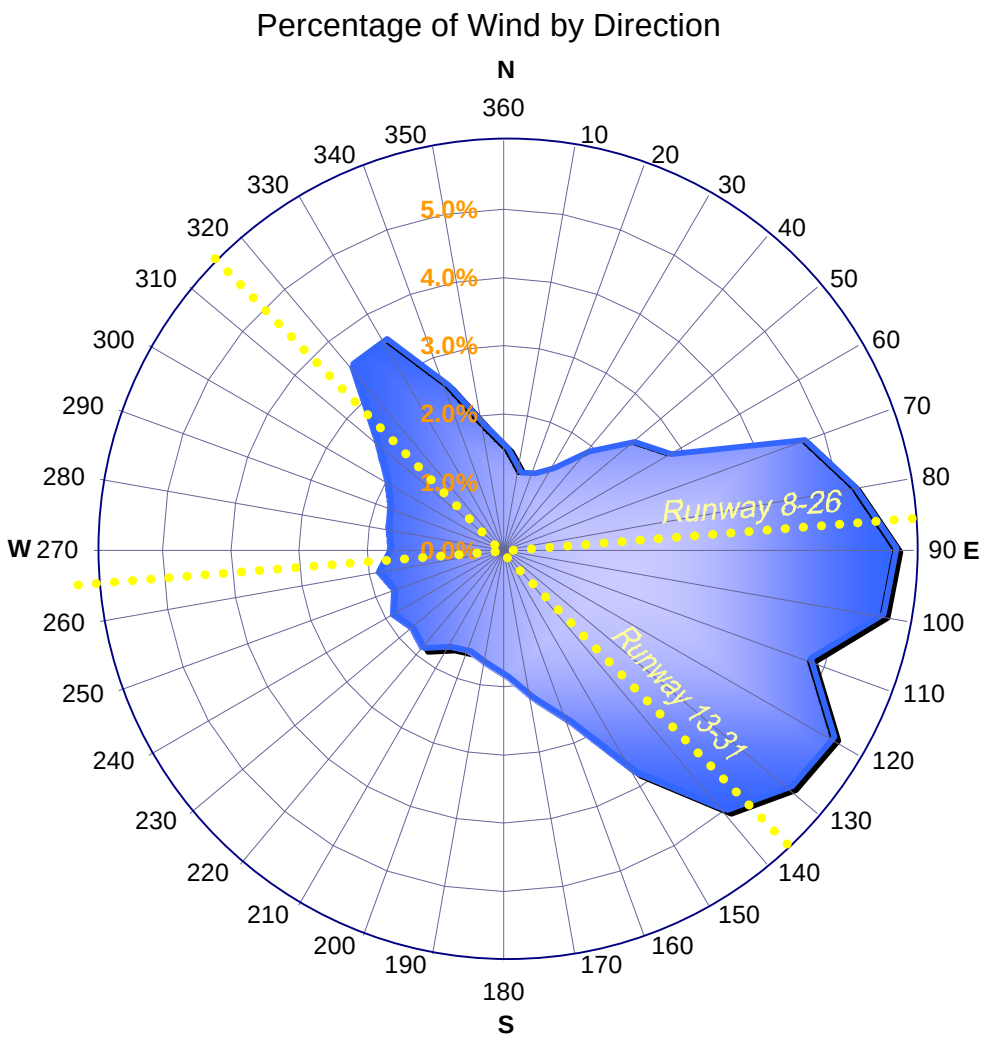


Exhibit 2-4

Percent Occurrence of Wind by Direction
(All Weather Conditions)

September 2005

Source: National Climatic Data Center, Local Climatological Data, Station #72203, Palm Beach, Florida, (Period of Record: 10 years).

Prepared by: Ricondo & Associates, Inc.

2.1.5.2 Ceiling and Visibility Minimums

The height of clouds and visibility have been previously mentioned as having an affect on aircraft operations and, hence, airfield capacity. As weather conditions deteriorate, pilots have to rely on instruments to define their position both vertically and horizontally. Capacity is lowered during such conditions because aircraft are spaced further apart by air traffic control to enhance the margins of safety for operations during periods of reduced visibility.

Based on the NCDC information for the vicinity from January 1995 through December 2004, PBI experienced VFR conditions 98.8 percent of the time and IFR conditions 1.2 percent of the time. Specific information for NCO was not available from the data center, thus again, PBI, which is approximately 12 miles away, reflects the closest available data source. The PBI information is reflected in Exhibit 2-5.

EXHIBIT 2-5
Average Weather Conditions

Ceiling and Visibility Minimums	Occurrence
VFR Conditions: Ceiling ≥ 1,000' and Horizontal Visibility ≥ 3 miles	98.8%
IFR Conditions: Ceiling between 500' and 1,000' and Horizontal Visibility between 0.5 and 3 miles	1.2%

Source: National Climatic Data Center, hourly observations, January 1, 1995, to December 31, 2004.
Prepared by Ricondo & Associates.

For aircraft with ILS approach capability, NCO is equipped with an ILS approach to Runway 8R, which provides for aircraft landings with cloud ceilings as low as 251 feet mean sea level (MSL) or 228 feet AGL and when visibility falls below 3/4 of a statute mile. Aircraft are prohibited from using the runway when weather conditions fall below these minimums. According to the weather observations recorded by the NCDC, weather conditions fall below the Runway 8R approach visibility minimums 0.2 percent of the time at PBI, which, given the proximity of the two airports, has been assumed to accurately represent conditions at NCO as well.

2.2 Airfield Capacity Analysis

The FAA methodology for capacity analysis involves a step-by-step process that addresses the factors discussed above. The analysis can become quite complicated given the number of operational scenarios that could be studied involving various combinations of these factors. Furthermore, the makeup of the airfield also presents some interesting challenges that are not addressed in the FAA methodology. Primarily, to what extent does an unlighted turf runway provide additional airport capacity when compared to the capacity enhancement provided by a paved and lighted runway? While certainly Runway 8L-26R provides an enhancement in the operational capacity of the airfield, it is not to the same level as the capability of Runway 8R-26L. The analysis needs to consider that should activity require added capacity, paving this runway would address the issue. Present and future airfield capacity was determined using guidance from FAA AC 150/5060-5, Change 2, Airport Capacity and Delay. Runway capacity was defined using two parameters--Hourly Capacity and Annual Service Volume of the airfield (ASV). This analysis is presented below.

2.2.1 Hourly Capacity of the Runways

Hourly capacity of the runways 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 used 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, touch-and-go factor, and exit factor. This equation is:

Hourly Capacity = C* x T x E

In this equation C* refers to the hourly capacity base, T is the touch-and-go factor, and E corresponds to the exit factor.

The hourly capacity base (C*) is determined from the appropriate graph based on the aircraft mix index and the percent of aircraft arrivals expected during the peak hour. The touch-and-go factor (T) is determined from the percent of touch-and-go operations and the aircraft mix index. For IFR calculations, T is always one because these training operations are generally not conducted, or do not occur, to a degree to affect operational activity during IFR conditions. In similar fashion, the exit factor (E) is determined from a table based on the aircraft mix index, percent of aircraft arrivals, and the number of taxiways within the specified exit range.

An airport's mix index can substantially change the value of the hourly capacity base in the FAA capacity tables. However, at NCO the mix index varies only slightly over the course of the planning period. For IFR calculations, the hourly capacity remains constant throughout the planning period. Exhibit 2-6 summarizes these hourly capacity values **that** and were used to calculate the annual service volume.

EXHIBIT 2-6
Based Hourly Capacities

Year	Mix Index	VFR Hourly Capacity	IFR Hourly Capacity
Base Year			
2004	0.0%	126	63
Forecast			
2010	2.5%	112	62
2015	5.0%	106	61
2020	7.5%	101	60
2025	10.0%	94	60

Source: Ricondo & Associates, Inc., September 2005.
Prepared by Ricondo & Associates, Inc.

2.2.2 Annual Service Volume

The second indicator of airfield capacity that must be computed is the ASV, which represents a measure of the approximate number of total operations that the airport can support annually. In other words, the ASV represents the theoretical limit of operations that the airport can safely accommodate without incurring exponentially increasing levels of delay to operations. Using the FAA's methodology to estimate ASV, first the ratio of annual demand to average daily demand during the peak month is calculated, along with the ratio of average daily demand to average peak-hour demand during the peak month. These values are then multiplied and the resulting product is multiplied by the weighted hourly capacity. This equation is:

Annual Service Volume = Cw x D x H

In this equation Cw corresponds to the weighted hourly capacity, D is the ratio of annual demand to average daily demand during the peak month, and H is the ratio of daily demand to average peak-hour demand during the peak month.

The calculated ASV accounts for differences in forecast activity levels, runway use, aircraft mix, weather conditions, and other factors that occur over a single year. For NCO, the projected ASV will slightly decrease throughout the planning period from a high of 381,713 to a low of280,912, because the aircraft mix index will increase, decreasing the airfield hourly capacity. Future capacity levels for the airport have been calculated based on the forecast annual operations and the ASV for the Airport. These levels are depicted in **Exhibit 2-7**. Based on the forecasts, NCO will not exceed the airport's ASV during the planning period.

EXHIBIT 2-7
Airfield Capacity Levels

Year	Annual Operations	Annual Service Volume	Capacity Level
Base Year			
2004	69,875	381,713	18.3%
Forecast			
2010	78,419	336,934	23.3%
2015	88,007	320,866	27.4%
2020	98,768	301,531	32.8%
2025	110,844	280,912	39.5%

Source: Ricondo & Associates, Inc., September 2005.
Prepared by Ricondo & Associates, Inc.

2.3 Summary/Recommendations

The analysis of airfield capacity for NCO clearly identifies that the Airport's existing runway system will not experience a capacity deficiency over the course of the planning period, given current forecasts of future activity levels. As such, the need for future airfield improvements will not be driven by sheer numbers of landings and takeoffs, but will be the result of use of the airport as it relates to runway length to provide for aircraft loads and destinations (stage lengths) from NCO.

SECTION 3

Runway Requirements

This section addresses the safety-related standards that are specifically identified by the FAA when considering airfield planning. The following defined areas enhance the safety of operations on and near the airfield:

- **Runway Safety Area (RSA):** is a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershot, 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; (3) capable, under dry conditions of supporting the occasional passage of aircraft without causing structural damage to the aircraft; and (4) free of objects, except for those that need to be located in the safety area because of their function. RSA standards cannot be modified or waived like other airport design standards. The dimensional standards remain in effect regardless of the presence of natural or manmade objects or surface conditions that might create a hazard to aircraft that leave the runway surface.
- **Runway Object Free Area (ROFA):** 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. Non-essential objects for air navigation or aircraft ground maneuvering purposes are not to be placed in the ROFA, including parked airplanes and objects used for agricultural operations.
- **Runway Protection Zone (RPZ):** 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 RPZ is dictated by guidelines set forth in FAA AC 150/5300-13, Change 9, 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.
- **Runway Obstacle Free Zone (OFZ):** a three-dimensional volume of airspace that supports the transition of ground to airborne operations (or vice versa). The OFZ clearing standards prohibit taxiing, parked airplanes, and other objects (except frangible NAVAIDs or fixed-function objects) from penetrating this zone. The runway OFZ and, when applicable, the precision OFZ, the inner-approach OFZ, and the inner-transitional OFZ, comprise the OFZ.

3.1 Airport Reference Code and Critical Aircraft

Airfield facilities (especially runways) needed at NCO to accommodate the projected level of aviation demand were determined using applicable FAA standards and requirements. The FAA has established a set of airport classifications known as ARCs that are applicable to each airport

and its individual runway and taxiway components. As noted in the previous section, the primary determinants of these classifications are the operational and physical characteristics of the most demanding types of aircraft intended to use the runway and taxiway system and the instrument approach minimums applicable to a particular runway end. Typically, an aircraft or type of aircraft must have 500 or more annual itinerant operations (equivalent to 250 departures and 250 landings) to be considered a critical aircraft. Each ARC consists of two components relating to aircraft design and performance. The first component, depicted by a letter, is the aircraft approach category, as determined by the approach speed of the critical aircraft. The second component, depicted by a Roman numeral, is the airplane design group, as determined by the critical aircraft's wingspan. Generally, aircraft approach speed applies to runways and runway-related facilities. Airplane wingspan relates primarily to separation criteria between runways, taxiways, parking areas, and taxilanes. Exhibit 3-1 summarizes the FAA aircraft classification as listed in AC 150/5300-13, Change 9.

EXHIBIT 3-1
FAA Aircraft Classifications

Aircraft Approach Category		Airplane Design Groups	
Category	Approach Speed (knots)	Design Group	Wingspan (ft)
A	< 91	I	< 49
B	91 but < 121	II	49 but < 79
C	121 but <141	III	79 but < 118
D	141 but < 166	IV	118 but < 171
E	> 166	V	171 but < 214
		VI	241 but < 262

Source: FAA AC 150/5300-13, Change 9, Airport Design.
Prepared by Ricondo & Associates, Inc., September 2005.

Aircraft Approach Categories A and B typically include small single- and twin-engine piston aircraft, a significant percentage of the turbo-prop fleet and, in the case of approach category B, a limited number of smaller business jets having approach speeds of 121 knots or less. Categories C and D consist of approximately one-half of the business jet fleet, larger commercial jets, and propeller aircraft generally associated with commercial and/or military use. Approach category E is almost exclusively composed of military jet aircraft. In the case of NCO, only aircraft in approach categories A, B, and C are anticipated to operate at the Airport and the Approach Category C aircraft would be made up of small to mid-sized business jets.

ADG I and II primarily include small single- and twin-engine piston aircraft, light and midsize business jets, and a variety of single- and twin-engine turboprop aircraft. ADG III includes only a limited number of large business jet models that have entered the fleet over the last 5 to 7 years, including the Canadair Global Express and the Gulfstream V, and is composed primarily of a large percentage of the commercial jet aircraft fleet.

According to the Airport Layout Drawing dated November 2003, the current airport reference code for NCO is identified as a B-II classification, which is intended to accommodate aircraft having approach speeds of less than 121 knots (Approach Category B), and wingspans of less than 79 feet (Design Group II). Currently, there are components of the business jet fleet that

occasionally operate at the Airport that are classified in approach category C, although the level of operations by these aircraft does not exceed the threshold for designating these users as the design aircraft (500 itinerant operations annually).

While most of the aircraft operating at the Airport are small, single-engine piston aircraft weighing less than 12,500 pounds, there are larger based and transient aircraft that perform frequent operations at the Airport. In 2004, for example, there were 20 turboprop and 7 jet aircraft based at the Airport. While the types of these based aircraft are not specified in airport records, it is likely that most of the jets and, potentially, some of the turboprop models exceed 12,500 pounds. For example, with the exception of a small number of VLJs, such as the Cessna Citation I and CJ1, which weigh 11,850 and 10,600 pounds, respectively, the U.S. jet fleet mix includes a majority of aircraft exceeding 12,500 pounds.

In addition, as noted in the Aviation Activity Forecasts, the growth of based jets at NCO will be enhanced by the programmed major roadway improvements that will significantly enhance the accessibility of NCO. Increased commercial aircraft traffic at PBI, along with the constrained available area for expanded general aviation development and the higher cost structure at PBI, will facilitate the shift of light, and even some mid-sized jets out of PBI to NCO.

To determine the adequacy of the current runway lengths at NCO to meet the forecast of demand, it was considered prudent to review the types of jets currently operating at PBI that would be likely candidates to shift their operations to NCO in the future. Among these aircraft, the Raytheon Beechjet 400 and 400A, the Bombardier Learjet 35, 45, and 60, the Cessna Citation II, V, VI, and VII, the Dassault Falcon 10 and 20, and the Raytheon Hawker 700 and 800 series are typical of light and midsize jet aircraft regularly operating at PBI and likely to fly into and out of NCO in the future, particularly given the pending impact of the Palm Beach County Technology Park and continued expansion of TSRI planned for 5 miles due west of the airport via the extension of PGA Boulevard.

As listed in Exhibit 3-2, all but one of these aircraft fall within Approach Categories B and C, and the all are within Design Group I and II. In the future, turbojet aircraft, such as the Cessna Citation VI and Dassault Falcon 20, represent the aircraft with the largest wingspans expected to regularly use the Airport. These aircraft, which have wingspans of less than 55 feet, are included under Design Group II aircraft standards. The Learjets, the Cessna Citation VI, and the Raytheon Hawker 700 and 800XP represent the aircraft with the fastest approach speeds. These aircraft fall within the C approach category, with the exception of the Learjet 35A, which has an approach speed of 143 knots, putting it just inside Category D. Because the aircraft listed in Exhibit 3-2 are considered to best represent the grouping of more demanding aircraft anticipated at the Airport, and the design requirements are essentially the same for approach categories C and D, an ARC of C-II would fully accommodate future aircraft traffic.

It would be ideal for the three runways at NCO to comply with the design standards associated with an ARC of C-II, but this would result in unnecessary improvement and maintenance costs and is unjustified by the traffic demand. Such improvements would require clearing and grading of larger ROFA and RSA, expanded clearing of potentially environmentally sensitive lands to meet RPZ requirements associated with each of the runway ends, and the relocation of Taxiways C and D. As previously established in the Airfield Demand/Capacity Analysis, the Airport capacity considerably exceeds the projected traffic demand. In light of the projected traffic demand and apart from other consideration, such as aircraft traffic segregation or

crosswind coverage, a single runway could accommodate projected traffic for years to come. Thus, only one of the runways at NCO should be upgraded to the C-II design standards, while the other runways should remain at B-II standards.

EXHIBIT 3-2
Representative Jets Expected at NCO

Aircraft Model	Est. Percent Jet Operations at PBI	Approach Category	Maximum Takeoff Weight (in lbs)	Wingspan and Design Group
Bombardier Learjet 35A	4.8%	D	18,300	39'6" – I
Bombardier Learjet 45	1.6%	C	19,500	47'1" – I
Bombardier Learjet 60	4.6%	C	23,500	43'9" – I
Cessna Citation II	3.0%	B	15,900	52'2" – II
Cessna Citation V	7.6%	B	15,900	52'2" – II
Cessna Citation VI/VII	3.6%	C	22,450	53'6" – II
Dassault Falcon 10	5.3%	B	18,740	42.9' – I
Dassault Falcon 20	5.3%	B	28,660	53.5' – II
Raytheon Beechjet 400	3.8%	B	16,100	43'6" – I
Raytheon Hawker 700	4.9%	C	25,500	47.0' – I
Raytheon Hawker 800XP	4.9%	C	28,000	51'5" – II

Source: PBI Operations Report—3/14/05-3/20/05; FAA AC 150/5300-13, Change 9, *Burns & McDonnell's Aircraft Characteristics (8th Edition)*.
Prepared by Ricondo & Associates, Inc., September 2005.

3.2 Airfield Safety Criteria Dimensioning

The approach visibility minimums, along with the Airport Reference Code for airfield planning, directly affect the size of various safety areas, including RSA, ROFA, and RPZ that are associated with each runway.

As indicated in the Demand/Capacity Analysis, VFR conditions prevail 98 percent of the time at NCO and the airport currently has an instrument approach capability to Runway 8R that provides for aircraft landings in visibility conditions down to 3/4 mile with ceilings of 251 feet MSL. While the development of additional ILS procedures might be desired, given the low percentage of time that visibility conditions require these capabilities, it is highly unlikely that the criteria for establishing additional full-precision approach capability could be satisfied. Thus, it has been assumed that the airport would continue to be served by the precision approach to Runway 8R and that future approaches to other runways would be limited to non-precision approach capabilities. As a result, the RSA, ROFA, and RPZs associated with Runway 8R-26L will continue to be dimensioned to provide for precision approach capability allowing for aircraft landings when horizontal visibility exceed 3/4 mile[2].

[2] In the future, as a result of enhanced GPS capabilities, all runways could offer precision approach capability. The use of GPS will avoid the installation of costly Instrument Landing System (ILS) at the Airport. Navigational aids and instrument approach procedures will be discussed in the second phase of this study.

For C-II runways, the FAA requires a ROFA width of 800 feet and a length of 1,000 feet beyond the runway ends. The RSA dimensioning is similar, but its width is reduced to 500 feet. The required RPZ dimensions for C-II runways offering precision approach capability with not lower than 3/4 statute mile approach visibility minimums have an inner width of 1,000 feet, an outer width of 1,510 feet, and an overall length of 1,700 feet. As noted, the current fleet mix does not require the immediate institution of full C-II criteria, however, as the fleet mix changes, one runway at NCO will need to be upgraded to meet this standard. Airport management should, as facilities are improved, undertake the incremental transition of the selected runway (to be identified in the alternatives analysis) from B-II to C-II.

The airfield safety criteria associated with B-II runways are less stringent than those associated with C-II requirements. Based on the design criteria for a runway serving an ARC of B-II, the FAA requires runway safety area and object-free area widths of 150 and 300 feet, respectively. Under B-II criteria the RSA and ROFA are required to extend 300 feet beyond the runway ends. RPZs associated with B-II runways offering visual approach capability with no lower than 1statute mile visibility minimums begin 200 feet beyond the end of the runway and have an inner width of 500 feet, an outer width of 1,010 feet, and extend outward 1,700 feet. The dimensional standards associated with both B-II and C-II runways are summarized in Section 3.5 and Exhibit 3-3.

EXHIBIT 3-3
B-II and C-II Runways Dimensional Standards

Item	C-II Standard Dimensions	B-II Standard Dimensions
Runway Length	Aircraft Specific	Aircraft Specific
Runway Width	100 ft	75 ft
Shoulder Width	20 ft	10 ft
Blast Pad Width	140 ft	95 ft
Blast Pad Length	200 ft	150 ft
Runway Safety Area Width	400 or 500 ft	150 ft
Runway Safety Area Length Beyond Runway End	1,000 ft	300 ft
Runway Object Free Area Width	800 ft	500 ft
Runway Object Free Area Length Beyond Runway End	1,000 ft[1]	300 ft
Runway Protection Zone Inner Width	1,000 ft[1]	1,000 ft[1]
Runway Protection Zone Outer Width	1,510 ft[1]	1,510 ft[1] 500 ft[2]
Runway Protection Zone Length	1,700 ft[1]	1,700 ft[1] 1,000 ft[2]

Source: FAA AC 5300-13, Change 9, Airport Design.
Notes:
[1] Approach Visibility Minimums not lower than 3/4 mile.
[2] Approach Visibility Minimums not lower than 1 mile.
Prepared by Ricondo & Associates, Inc., September 2005.

3.3 Runway Width and Strength

FAA AC 150/5300-13 recommends that runways serving ARC C-II aircraft on a regular basis have a width of 100 feet. Runway 8L-26's width complies with the FAA standard, however, given the turf surface of this runway, it is highly unlikely that Runway 8L-26R would experience operations by aircraft in approach category C. Runways 13-31 and 8L-26R are both 75 feet wide, short of the FAA standard by 25 feet. Depending on which runway is selected for the upgrade to C-II criteria, the widening of one of these two runways will be necessary over the planning period.

3.4 Runway Pavement Strength

Information provided by the Palm Beach County DOA, as well as delineated on the current Airport Layout Drawing, indicates that Runway 8R-26L has a strength rating of 12,500 pounds, while the pavement strength for Runway 13-31 has an existing gross-weight-bearing capacity of 30,000, pounds allowing this runway to be used by small corporate jet aircraft. The maximum takeoff weight of the small to mid-sized business jet aircraft that are anticipated to regularly use the Airport is expected to exceed the actual gross-weight-bearing capacity for both Runways 8R-26L and 13-31. Because a large majority of light and midsize business jets have maximum takeoff weights that range between 12,500 and 40,000 pounds, potentially some strengthening of existing runway pavements may be necessary to allow these aircraft to use Runway 8R for their instrument landings, as well as to allow Runway 13-31 to be capable of accommodating an aircraft slightly exceeding the current 30,000 pound strength. The DOA should monitor fleet activity and destinations served over the course of the planning period to determine if, and when, such strengthening of Runway 13-31 should be undertaken.

3.5 Runway Dimensional Standards Summary

Exhibit 3-3 summarizes the dimensional standards applicable to both B-II and C-II runways. As previously discussed, based on the forecast fleet mix and operations that will be conducted from each runway, an ARC of C-II is required for one of the two paved runways at NCO and a B-II ARC will adequately serve the other paved runway and Runway 8L-26R. The dimensional standards presented in Exhibit 3-3 relate to runway width, ROFAs, OFZs, safety areas, RPZs, runway shoulders, and runway blast pads. The variation in the dimensions of the RPZ under the B-II criteria is associated with the difference in the lower approach minimums available on Runway 8R-26L and the minimums associated with the other runways at NCO.

3.6 Assessment of Takeoff Runway Length Requirement

The length of a runway or a system of runways is a critical component that defines the capability of an airport to accommodate specific types of air traffic and to allow aircraft to fly longer stage lengths with high payloads. In a system of airports such as the case in Palm Beach County, various airports are often designed with different roles. For example, PBI is designed to accommodate a wide variety of commercial passenger and cargo aircraft, while also being capable of meeting the needs of some of the largest general aviation aircraft in the fleet. However, the success of this facility at satisfying its role requires that other facilities in the

system act as alternates or relievers for certain segments of demand to allow PBI to more efficiently and cost-effectively meet its primary purpose. In the past, LNA has accommodated a significant share of the small general aviation activity that might otherwise occur at PBI, but LNA is facing significant constraints including limitations on jet operations and a deficiency of area for further ramp and hangar development. As a result, NCO has taken on an increasingly expanding role in the Palm Beach airport system and is the only viable facility to accommodate additional general aviation growth and additional operations by small to mid-size jets that seek to base and operate away from PBI. Therefore, the capability of the NCO runway system to accommodate this activity efficiently and effectively is a key consideration, particularly given the current limited length of the three runways at NCO. While insufficient runway length may preclude operations by specific aircraft and present restrictions of operations for other aircraft, runways that are too long result in unnecessary development and maintenance costs. As such, it is important to ensure that the airfield runway length provide for a realistic capability to meet the takeoff and landing needs of the aircraft expected at the Airport without overbuilding.

The length of the runway is determined by considering either the family of aircraft having similar performance characteristics or a specific aircraft that operates frequently into and out of the airport or is based at the facility that drive the runway length requirements. In either case, the choice is based on the aircraft that currently use, or are forecast to us, the runway on a regular basis. As noted in the forecasts for NCO, the airport is already home to seven based jet aircraft and is forecast to experience an increase in both based jets and activity by itinerant jet operators. This document is intended to provide a long-term plan for the Airport, so the takeoff runway length requirements analysis considered a group of small and mid-sized business jet aircraft. Because the fleet of aircraft expected to regularly use the Airport will evolve over time, it is prudent to focus on a family of aircraft.

The FAA's computer program derived from Advisory Circular 150/5325-4A, Runway Length Requirements for Airport Design, in addition to flight planning manuals of specific business jet aircraft, were used to aid in defining the appropriate future runway length at NCO.

While the operating weight of the specific aircraft is one consideration in defining takeoff runway length requirements, there are other factors that contribute to the determination of runway length. These factors were also identified and the calculation of runway length needs was adjusted to account for the following required considerations:

- Airport Elevation
- Meteorological Conditions, notably temperature
- Runway Slope
- Aircraft Takeoff Weight

3.6.1 Airport Elevation

A high airport elevation results in a dramatic decline in an aircraft's takeoff performance. As altitude increases, the density of the air decreases. When the pressure altitude increases for a given weight, the true air speed of an aircraft must be increased to provide the necessary lift and compensate for the air density reduction. Therefore, the takeoff distance is increased. Similarly, when the pressure altitude increases, the performance of most jet engines is reduced and available takeoff thrust is reduced, increasing takeoff distances and reducing takeoff climb gradients. The impact of elevation, however, is negligible given the 22 feet MSL elevation of NCO.

3.6.2 Meteorological Conditions

3.6.2.1 Temperature

Air density not only relates to the airport elevation, it also varies according to the ambient temperature. Air density or temperature affects the power output of engines, efficiency of propellers, and lift generated by aircraft wings; when air temperature increases, the density of the air decreases, directly affecting aircraft performance in a negative manner. Aircraft engines produce thrust in proportion to the weight or density of the air. Therefore, as air density decreases, the power output of the engine decreases.

The climate in the Palm Beach area is typically very humid and hot, particularly from April through November. As illustrated in Exhibit 3-4, the average highs for the months of July and August reach 90 degrees Fahrenheit and recorded temperatures routinely exceed 90 degrees Fahrenheit for approximately 20 days per month. For this study, takeoff runway lengths were determined for a "hot" day and an average temperature of 90 degrees Fahrenheit was selected to enable comparison of aircraft performance. It should be noted that this is a reasonable assumption and approach because temperatures of 90 degrees and above routinely occur throughout the summer and last for extended periods of the normal summer day.

3.6.2.2 Precipitation

Precipitation is often factored into the runway length equation, as takeoffs made from runways wet conditions must consider the accumulative effects of reduced acceleration from pooling water and from the water that is left on the runway surface during a rain event. As indicated in Exhibit 3-5, summer is the wettest season in the Palm Beach area with precipitation averaging 7.1 inches for the months of June, July, August, and September, based on a 30-year sample from the NCDC.

The National Weather Service reports an average of 11 days per month with precipitation greater than or equal to 0.01 inch. Because rain showers are common in the Palm Beach area, both dry and wet takeoff runway length requirements were calculated. It should be noted that surface treatment of runways and the grooving of runways can mitigate the effect of wet operational conditions. At a minimum, that is the position of the FAA, although aircraft operators and specific flight manuals of some manufacturers do not always concur. For purposes of this analysis, a methodology used by the International Civil Aviation Organization (ICAO) was used, resulting in an adjustment of runway lengths required during dry conditions. Required runway lengths were increased 15 percent to account for the aircraft operation during periods of rainfall and wet runway conditions.

3.6.3 Aircraft Takeoff Weight

Takeoff runway length requirements were calculated assuming that aircraft would take off at their rated maximum gross takeoff weight. Because there is no realistic way that this analysis can define the jet operators by their origin and destinations over the planning period, nor determine their flying habits (whether they will opt to make intermediate stops for fuel or fly with a full fuel load from NCO). It is known that jet operators routinely flying business jet aircraft into PBI arrive from airports throughout the United States and that PBI is one of the top five airports in the nation for aircraft operated by fractional ownership operators. The aircraft seen at PBI include a number of large business jet models, but are predominantly composed of a large percentage of small and mid-sized business jets that have been identified as potential users of NCO. As a result, the use of maximum gross takeoff weight is a reasonable approach to defining the long-term runway length requirements for the airport.

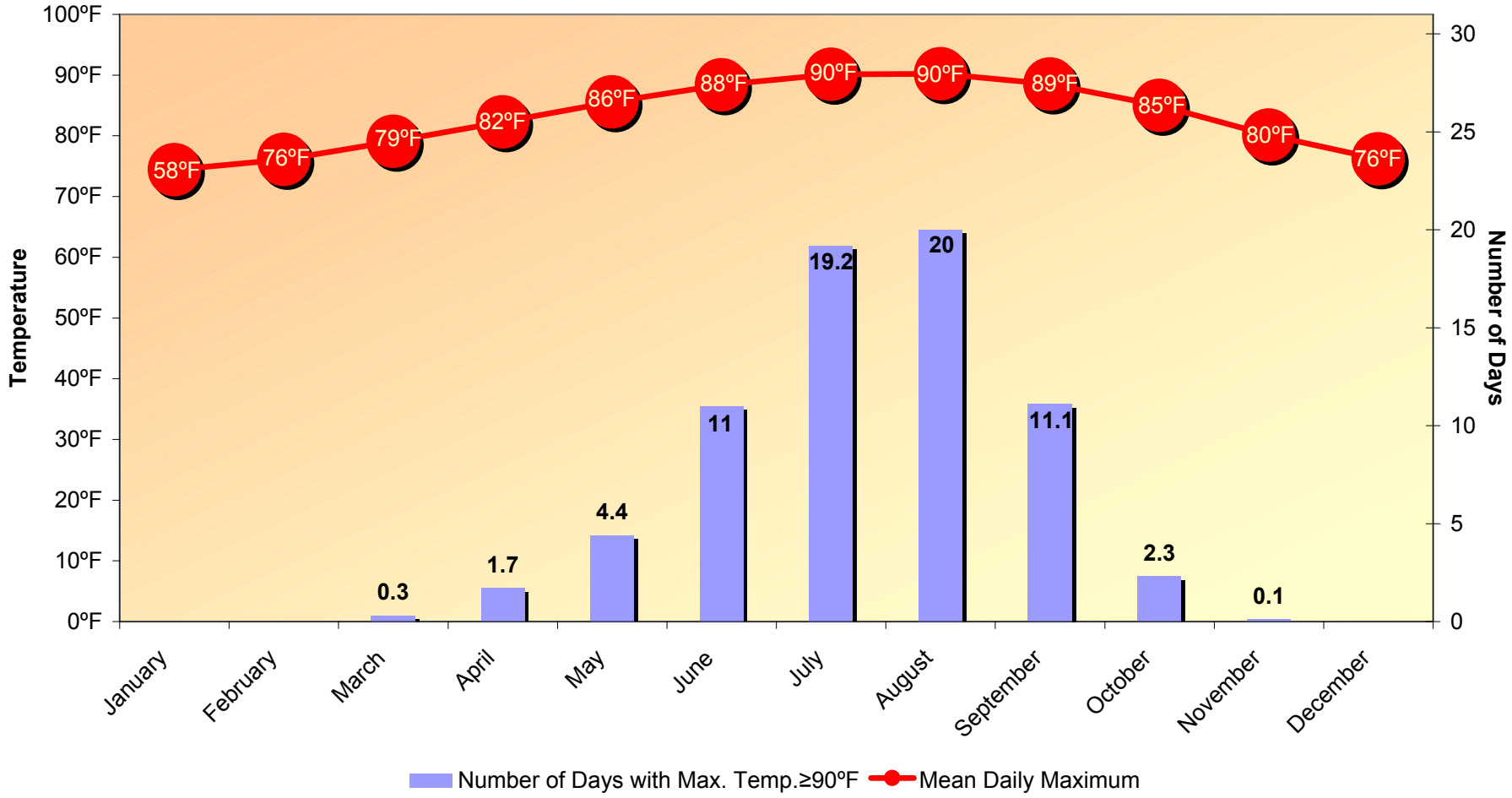


Exhibit 3-4

Monthly Temperature Averages

Source: National Climatic Data Center, Local Climatological Data, West Palm Beach, Florida (Period of Record: 30 Years)

Prepared by: Ricondo & Associates, Inc.

September 2005

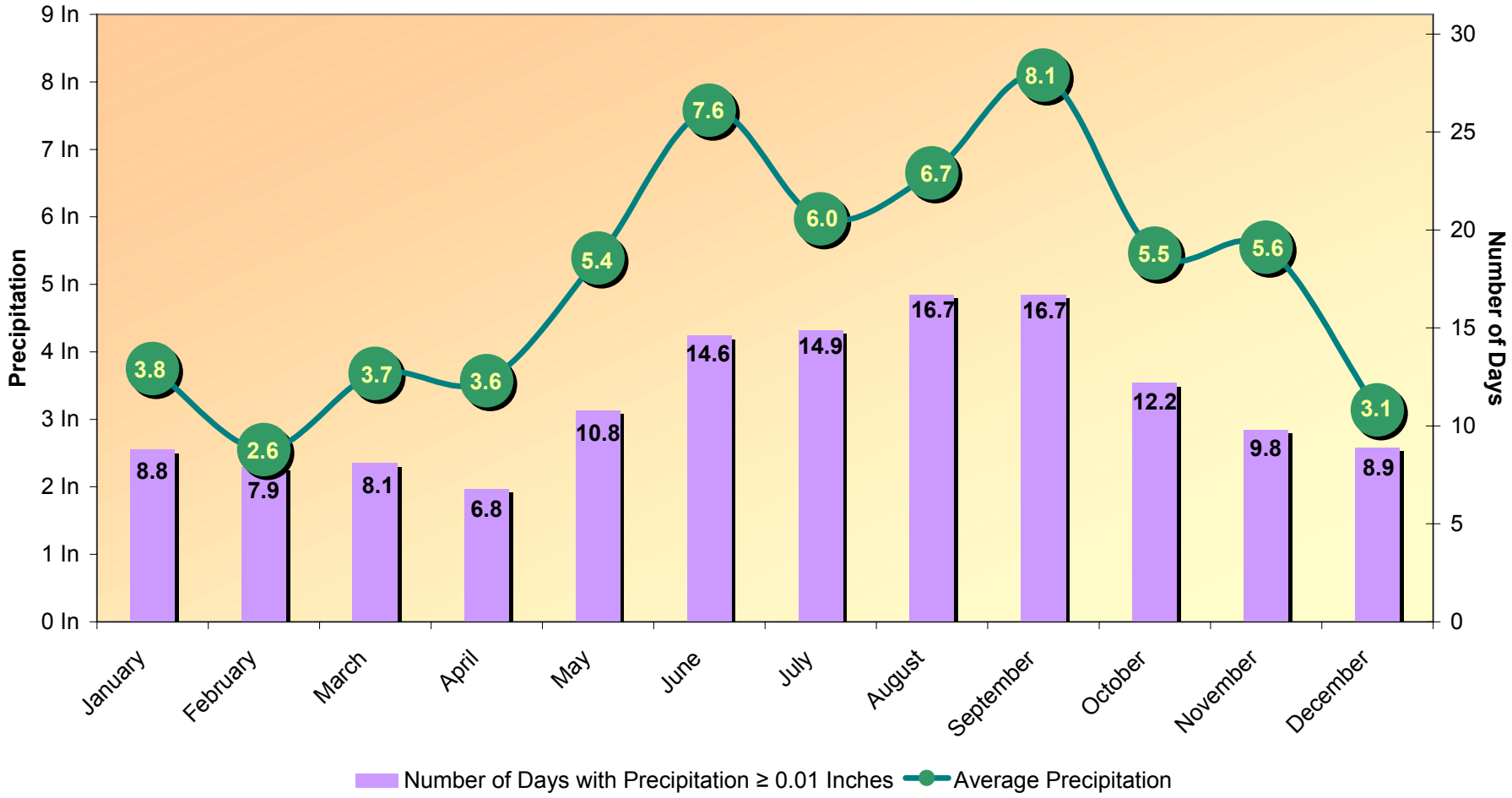


Exhibit 3-5

Monthly Precipitation Averages

Source: National Climatic Data Center, Local Climatological Data, West Palm Beach, Florida (Period of Record: 30 Years)

Prepared by: Ricondo & Associates, Inc.

September 2005

3.6.4 Analysis Results

The following text summarizes the results of the runway length analysis that was conducted for NCO, and includes a description of the results that were obtained using the FAA Airport Design Software. It also identifies future runway needs based on the aircraft balanced field length requirement obtained on the flight planning manuals of each individual aircraft.

Because the FAA software includes in its computation aircraft that are not necessarily expected to operate at the Airport, further analysis of the runway length needed to accommodate small to mid-size business jets expected at NCO was conducted. This analysis included a review of the balanced field length at maximum takeoff weight found in the characteristic manuals of individual aircraft.

Both of these methods are discussed below.

3.6.4.1 Runway Length Requirement using FAA Airport Design Software

The first method of runway length analysis employed the FAA's runway length computer program that is part of their airport design software package. The FAA program calculates runway length for various classes of aircraft using several inputs including airport elevation, mean daily maximum temperature (of the hottest month), maximum difference in runway centerline elevation, and typical weather conditions (dry or wet runway). The software outputs include runway length requirements by aggregated categories of aircraft adjusted to account for the aforementioned inputs.

Runway lengths are categorized by the percentage of the aircraft fleet of a particular size that can use the runway at a given percentage of their maximum load. An aircraft's load includes passengers and their baggage, cargo, and fuel. To run the software, the mean maximum temperature of the hottest month was set at 90 degrees Fahrenheit and the Airport elevation at 22 feet. Finally, the effective gradient of the runways was assumed to be zero.

Using these data, the Airport Design program provides runway length recommendations for both various categories of the small aircraft fleet (weighing less than 12,500 pounds) and large aircraft (weighing more than 12,500 pounds) according to meeting either 75 percent or 100 percent of the aircraft fleet at either 60 percent of useful load or at 90 percent. Exhibit 3-6 summarizes the data provided by the program.

EXHIBIT 3-6
FAA Runway Lengths Recommended for Airport Design

Item	Calculated Runway Length	
	Dry Runway	Wet and Slippery Runway
Small airplanes with approach speeds of less than 30 knots	300	300
Small airplanes with approach speeds of less than 50 knots	800	800
Small airplanes with less than 10 passenger seats		
75 percent of these small airplanes	2,510	2,510
95 percent of these small airplanes	3,080	3,080
100 percent of these small airplanes	3,640	3,640
Small airplanes with 10 or more passenger seats	4,260	4,260

EXHIBIT 3-6
FAA Runway Lengths Recommended for Airport Design

Item	Calculated Runway Length	
	Dry Runway	Wet and Slippery Runway
Large airplanes of 60,000 pounds or less		
75 percent of these large airplanes at 60 percent useful load	4,650	5,350
75 percent of these large airplanes at 90 percent useful load	6,700	7,000
100 percent of these large airplanes at 60 percent useful load	5,430	5,500
100 percent of these large airplanes at 90 percent useful load	8,310	8,310

Source: FAA AC 150/5325, Runway Length Requirements for Airport Design, Chapter 2.
Prepared by Ricondo & Associates, Inc., September 2005.

Based on the FAA methodology, NCO's primary runway length is sufficient for all small aircraft that might be expected to operate at the Airport. (A small airplane is defined as an aircraft with a maximum certificated weight of 12,500 or less.) However, the current runway lengths would not accommodate large aircraft weighing between 12,500 and 60,000 pounds, which would include the various business jet models that have been previously noted.

In reviewing the FAA design program results, two outputs appear to set an upper and lower limit of runway length. These consist of the length analyses associated with a reduced percentage of the fleet at a higher load (75 percent of fleet at 90 percent load) and the accommodation of the full fleet at a reduced load (100 percent of fleet at 60 percent load). When the results for these two categories are reviewed, it would appear that a runway length somewhere in the middle would tend to balance the issue of fleet percentage accommodation while also providing for aircraft loading. In short, it would appear that a runway length in the 6,000-foot range would provide for fleet coverage at a payload and range level that would meet the majority of user needs.

3.6.4.2 Runway Length Calculation using Aircraft Characteristics Manuals

Aircraft characteristics manuals of a selected set of business jets were reviewed to obtain the balanced field length at maximum takeoff weight. Exhibit 3-7 summarizes the results of this analysis, while Exhibits 3-8, 3-9, and 3-10 depict the analysis results.

EXHIBIT 3-7
Business Jet Aircraft Takeoff Runway Length Requirement

Aircraft Manufacturer	Aircraft Model	Jet Aircraft Category	ARC	Required Dry Runway Takeoff Length (ft)	Required Wet Runway Takeoff Length (ft)
Bombardier	Learjet 35A/36A	Light	C-I	5,753	6,616
Cessna	Citation Bravo	Light	N/A	4,166	4,791
Cessna	Citation Encore	Light	N/A	4,039	4,644
Cessna	Citation I	Light	B-I	3,564	4,099
Cessna	Citation II	Light	B-II	3,992	4,591
Cessna	Citation Mustang	Light		3,610	4,152

EXHIBIT 3-7
Business Jet Aircraft Takeoff Runway Length Requirement

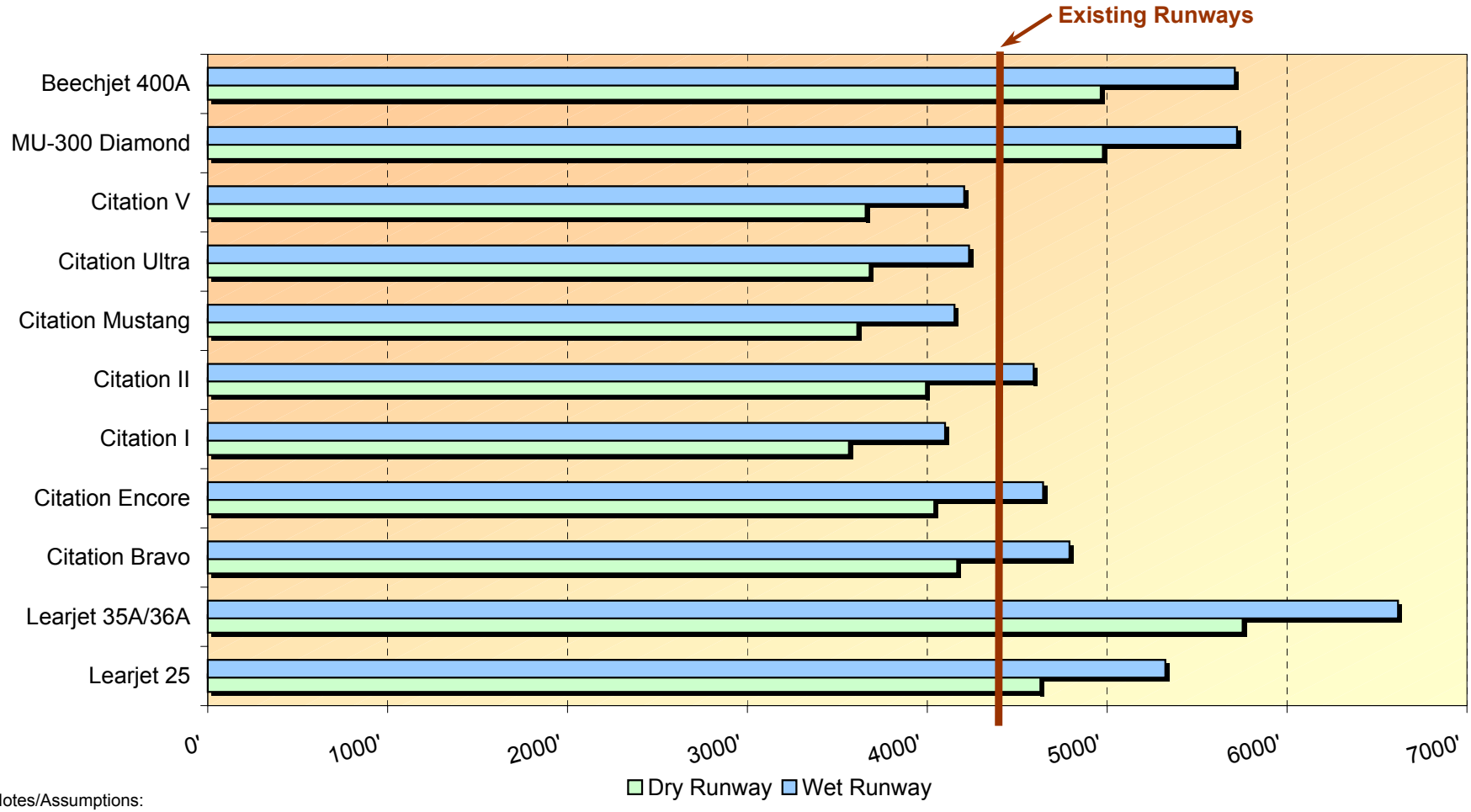
Aircraft Manufacturer	Aircraft Model	Jet Aircraft Category	ARC	Required Dry Runway Takeoff Length (ft)	Required Wet Runway Takeoff Length (ft)
Cessna	Citation Ultra	Light	B-II	3,680	4,232
Cessna	Citation V	Light	B-II	3,657	4,205
Mitsubishi	MU-300 Diamond	Light	B-I	4,976	5,722
Raytheon/Beechcraft	Beechjet 400A	Light	B-I	4,964	5,709
Bombardier	Learjet 40	Midsize	C-I	5,006	5,757
Bombardier	Learjet 45XR	Midsize	C-I	5,855	6,734
Bombardier	Learjet 55C	Midsize	C-I	6,478	7,450
Cessna	Citation III	Midsize	B-II	5,959	6,853
Cessna	Citation Sovereign	Midsize	N/A	4,275	4,916
Cessna	Citation VI	Midsize	C-II	5,959	6,853
Cessna	Citation VII	Midsize	C-II	5,427	6,241
Cessna	Citation X	Midsize	C-II	5,948	6,840
Dassault	Falcon 10	Midsize	B-I	5,207	5,988
Dassault	Falcon 20-5	Midsize	B-II	6,735	7,745
Israel Aircraft Industries	Astra 1126 Galaxy/ Gulfstream G200	Midsize	C-II	6,364	7,319
Israel Aircraft Industries	Astra1125 SP	Midsize	C-II	6,133	7,053
Israel Aircraft Industries	Astra 1125 SPX/Gulfstream G100	Midsize	C-II	6,243	7,179
Israel Aircraft Industries	Westwind 1124A	Midsize	C-I	6,075	6,986
Raytheon	Hawker 125-800XP	Midsize	B-II	5,821	6,694
Raytheon	Hawker 125-1000 Horizon	Midsize	B-II	6,075	6,986
Bombardier	Challenger 604	Heavy	C-II	6,758	7,772
Bombardier	Challenger 800	Heavy	C-II	7,284	8,377
Dassault	Falcon 2000	Heavy	B-II	6,729	7,738
Dassault	Falcon 50EX	Heavy	B-II	5,659	6,507
Dassault	Falcon 900EX	Heavy	B-II	6,035	6,940
Gulfstream	Gulfstream II	Heavy	C-II	6,509	7,485
Gulfstream	Gulfstream III	Heavy	C-II	5,919	6,807

Sources: Aircraft Performance Manuals.

Notes:

These data assume an airport elevation of 22 feet, a temperature of 90 degrees Fahrenheit, MTOW, and zero wind. Altitude corrections assume a takeoff length increase of 7% per 1000 feet above sea level. Temperature correction assumes a takeoff length increase of 0.50% per degree above the adjusted standard temperature. The difference between the runways low and high points is assumed to be zero. Wet runway takeoff length requirements assume an increase of the dry runway takeoff lengths by 15%.

Prepared by: Ricondo & Associates, Inc., May 2005.



Notes/Assumptions:

1/ Data are shown for a zero runway gradient, zero wind, and air conditioning off.

2/ Each value has been corrected to reflect the Airport elevation of 22 feet.

These altitude corrections assume a takeoff length increase of 7% per 1000 feet above sea level.

3/Temperature correction assumes a takeoff length increase of 0.50% per degree above the adjusted standard temperature.

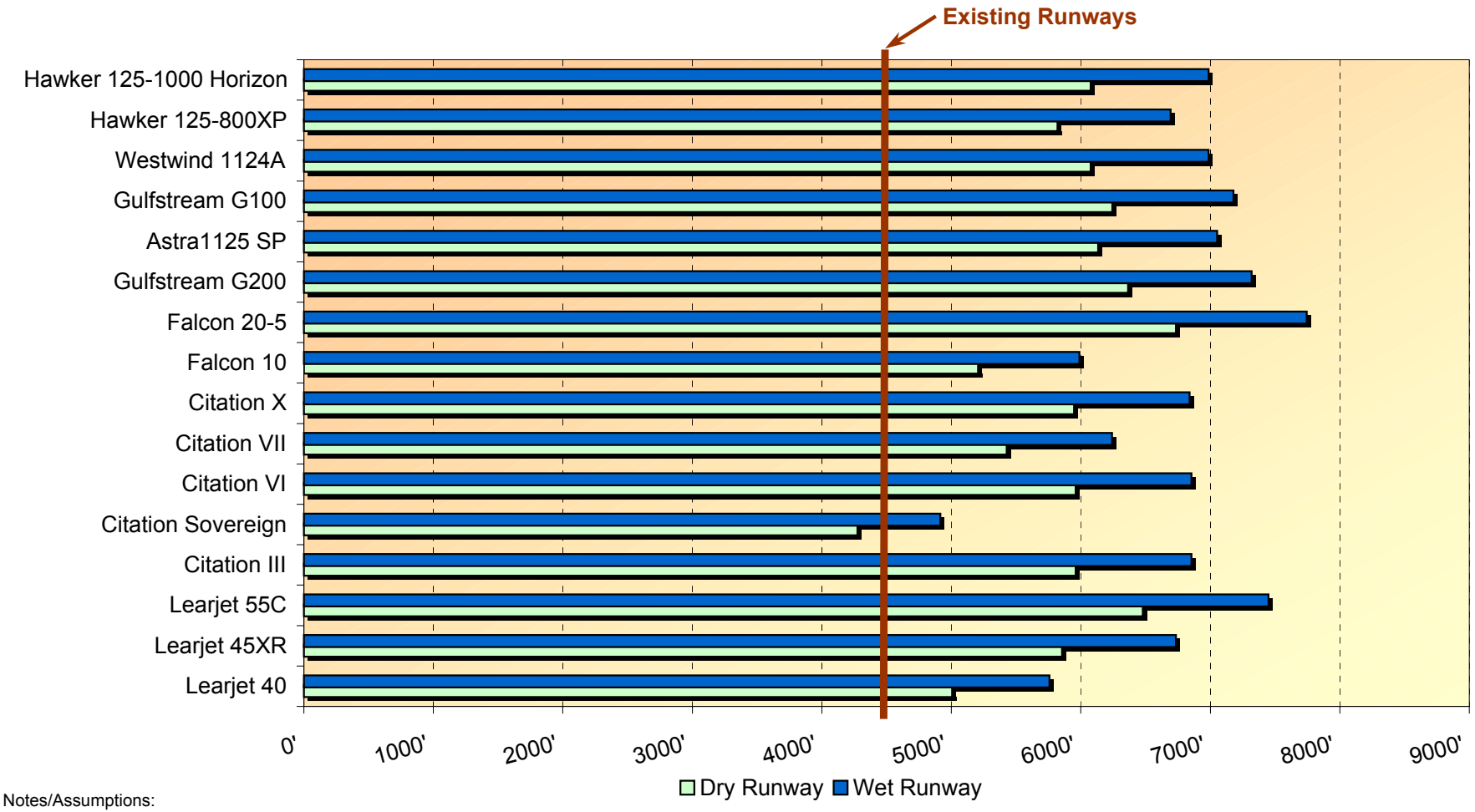
Exhibit 3-8

Light Business Jet Aircraft Takeoff Length Requirements (at MTOW)

September 2005

Sources: Airplane Characteristics Manuals

Prepared by: Ricondo & Associates, Inc.



Notes/Assumptions:

1/ Data are shown for a zero runway gradient, zero wind, and air conditioning off.

2/ Each value has been corrected to reflect the Airport elevation of 22 feet.

These altitude corrections assume a takeoff length increase of 7% per 1000 feet above sea level.

3/Temperature correction assumes a takeoff length increase of 0.50% per degree above the adjusted standard temperature.

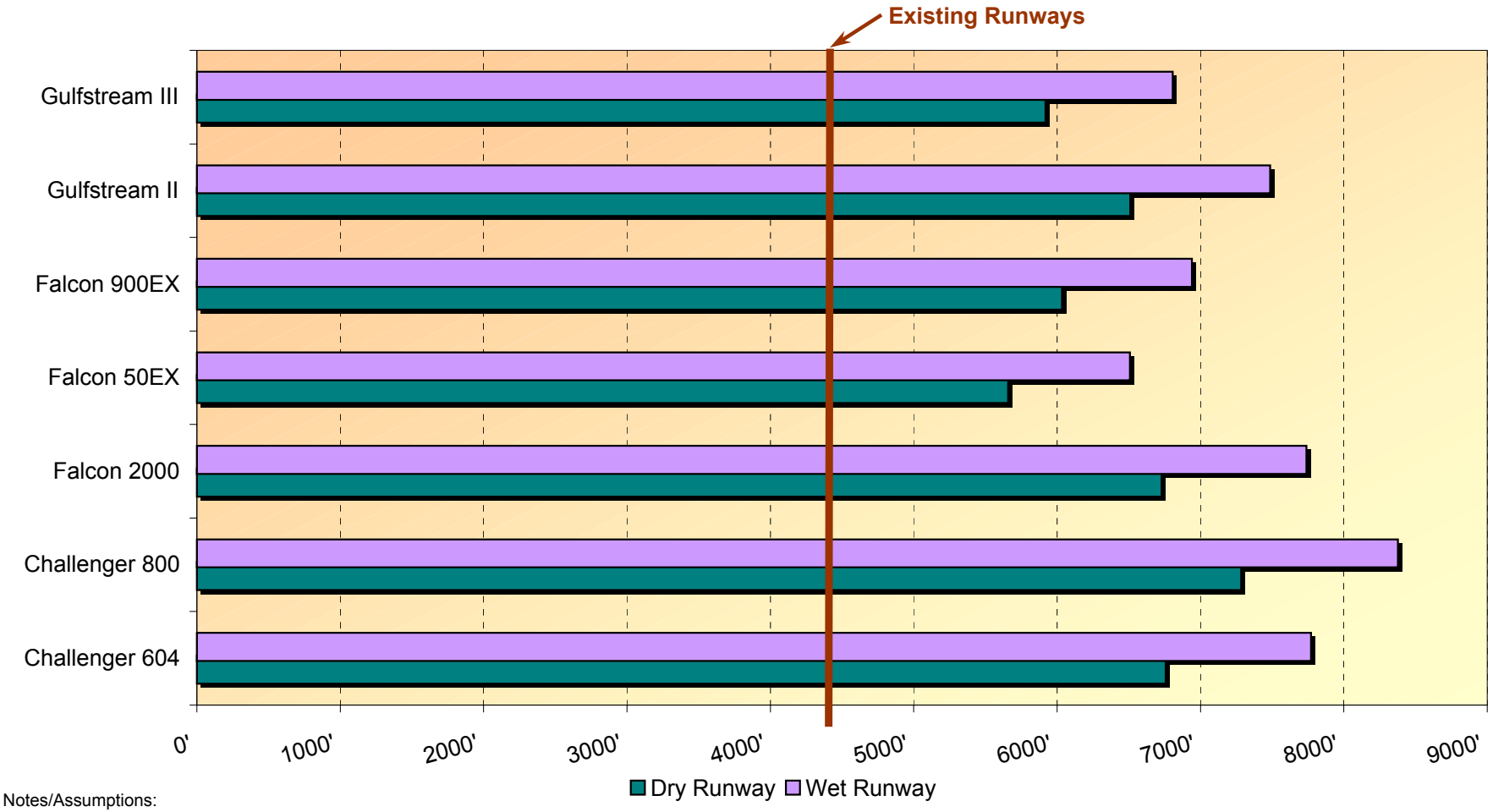
Exhibit 3-9

Midsize Business Jet Aircraft Takeoff Length Requirements (at MTOW)

Sources: Airplane Characteristics Manuals

Prepared by: Ricondo & Associates, Inc.

September 2005



Notes/Assumptions:

1/ Data are shown for a zero runway gradient, zero wind, and air conditioning off.

2/ Each value has been corrected to reflect the Airport elevation of 22 feet.

These altitude corrections assume a takeoff length increase of 7% per 1000 feet above sea level.

3/Temperature correction assumes a takeoff length increase of 0.50% per degree above the adjusted standard temperature.

Exhibit 3-10

Heavy Business Jet Aircraft Takeoff Length Requirements (at MTOW)

September 2005

Sources: Airplane Characteristics Manuals

Prepared by: Ricondo & Associates, Inc.

The aircraft listed represent some, but not necessarily all, of the fleet of business jet aircraft expected to use the Airport on a regular basis, resulting in more than the required threshold of operations to support the need for additional takeoff runway length. Based on this analysis and the runway length requirements associated with the small to mid-size business jets, it is clear that a portion of the light business jet fleet can be accommodated by the current 4,300-foot-long runways; however, several light jet models and most of the mid-size jets would face weight penalties that could significantly affect their ability to operate. Although this is not a complete list of the aircraft expected to use the airfield, it does provide greater detail than the more general figures calculated by the FAA software. For purposes of this analysis the fleet of business jets anticipated at the Airport was divided into three classifications based on their published maximum takeoff weight (MTOW). These groups consist of:

- Light Business Jet Aircraft consisting of business jets weighing less than 18,500 pounds
- Mid-Size Business Jet Aircraft consisting of business jets between 18,500 pounds and 37,000 pounds
- Heavy Business Jet Aircraft consisting of business jets weighing more than 37,000 pounds

The runway length requirements for each of the aircraft listed in Exhibit 3-7 indicate that:

- Light jet aircraft with the exception of the Bombardier Learjet 35A/36A can operate on 5,000 feet of runway at MTOW under dry runway conditions. The Learjet 35A is a popular aircraft in the U.S. business jet fleet.
- With the exception of the Dassault Falcon 20-5, mid-size jet aircraft can operate on a runway of up to 6,400 feet at MTOW under dry runway conditions given temperature conditions in the area.
- With the exception of the Bombardier Challenger 800, heavy jet aircraft, that fall within Approach Category C and Design Group II, could operate on a runway of 7,000 feet and, in several cases, less at MTOW under dry runway conditions, although it is assumed that most of the aircraft in this category would opt to use PBI
- Runway length requirements for light jet aircraft under dry and wet runway conditions average 4,275 and 4,917 feet, respectively
- Runway length requirements for midsize jet aircraft under dry and wet runway conditions average 5,848 and 6,725 feet, respectively
- Runway length requirements for heavy jet aircraft under dry and wet runway conditions average 6,400 and 7,350 feet, respectively
- Runway length requirements for all aircraft under dry and wet runway conditions average 5,480 and 6,302 feet, respectively

In light of this information, it is clear that runway length requirements vary considerably from one aircraft type to another. While it would be ideal to construct a runway that would fully satisfy the length requirements in both wet and dry conditions and for all aircraft types identified in the analysis, this is not a reasonable or financially realistic approach. It is clear that an enhancement to runway length at NCO is needed for the airport to properly serve in its role as a reliever for PBI, and to do so effectively requires that NCO be capable of providing facilities

for both the very small piston aircraft (up to and including providing an outlet for a portion of the business jet fleet). In so doing, NCO can aid PBI in fulfilling its primary goal as the principal commercial service airport serving a multi-county market area.

In addressing runway length at NCO it was determined through discussions with the DOA that a runway length adequate to meet the needs of the entire fleet of light jets operating under dry conditions should be considered. Additionally, the selected runway length should also provide for a significant share of the fleet of mid-size jets under dry operational conditions. After reviewing the results of the analysis as presented in Exhibit 3-7 it was apparent that an extension of one of the two paved runways at NCO to a total length of 6,000 feet would satisfy this need and was well supported by the results of the analysis and by the characteristic and popularity of the aircraft types that could be accommodated by this length of runway. Aircraft including the Citation III; Learjet 35 and 45; Citation VI, VII, and X; and Hawker 125-800 are all common business jet models and routinely operate in the Palm Beach market. Meeting the needs of the small and mid-size jets, along with the piston and turbo-prop market, is consistent with the role that NCO needs to play in the region, given limitations emerging at PBI and those that preclude such a role at LNA. For planning purposes, and based on the identified need, it is recommended that either Runway 8R-26L or Runway 13-31 be extended to provide a total available length of 6,000 feet for landings and for takeoff at NCO.

3.7 Summary

The preceding sections have discussed the design-related requirements associated with the existing airfield at NCO, along with proposed changes in the airport reference code that need to be considered to meet the expected activity over the course of the planning period. Additionally, this analysis also reviewed the basis for considering an extension to one of the two paved runways at NCO to a length of 6,000 feet. The study has noted that the proposed length would enhance the capability of the airport to act in its role as a reliever facility to PBI, while at the same time balancing the length of the extension with a realization that while additional length could have been recommended and justified, the proposed extension is a reasonable and economically realistic enhancement that does not duplicate facilities available within the Palm Beach system of airports.

SECTION 4

Runway Extension Alternatives

The previous analysis identified the need to extend one of the runways at NCO to a length of 6,000 feet to better provide for current activity at the Airport and to ensure the facility's ability to meet future forecast demand. Despite the fact that the property envelope in which NCO is located consists of an extensive amount of undeveloped land, several combined factors limit and, at the same time, guide potential future Airport development. These factors consist of natural environmental features, manmade facilities as well as pending improvements to these facilities, and the provision of development agreements that establish the parameters guiding the development of the Airport.

The need to extend one of the runways at NCO to a total length of 6,000 feet has been identified as necessary to better accommodate both existing and future Airport users. At 4,300 feet, Runways 8R-26L and 13-31 currently are capable of accommodating a majority of the small general aviation aircraft fleet, however, based on the findings of the runway length analysis, the existing runway length does not adequately support operations by an array of midsize business jets.

4.1 Airport Setting

NCO is located in the northeast quadrant of Palm Beach County, approximately 13 miles northeast of West Palm Beach. The Airport lies adjacent to the municipality of Palm Beach Gardens and is sited west of the Bee Line Highway (S.R. 710) and the C.S.X. railroad alignment, between the extended centerline of PGA Boulevard to the south, and the C-18 Canal further to the north.

While there are no land uses that could directly affect or influence runway development, low-density residential areas exist approximately 2 miles north and northeast of the Airport. In addition, residential development spreads along Northlake Boulevard, which runs in an east-west direction approximately 2 miles south of the Airport. Because these areas are fairly distant from the Airport, these land use categories would remain compatible with airport operations in respect to noise compatibility.

4.2 Factors Influencing Airfield Development Alternatives

While the preceding sections identified the need to provide additional runway length, these analyses did not determine how this might be achieved and what alternative would be the most viable for doing so. The following text briefly describes the runway development alternatives that best meet the need of providing a 6,000-foot-long runway at NCO that comply with the FAA design requirements associated with an ARC of C-II, while considering the natural, manmade, and regulatory factors that influence the viability of extending the runway.

4.2.1 Development Order Provisions

Key among the factors guiding the development of the airfield alternatives are the parameters established in the Development of Regional Impact analysis and subsequent Development

Order for the development of NCO on approximately 1,832 acres of land that was originally approved on March 2, 1990. This Development Order specifically approved construction of two parallel runways of 4,300 feet in length and 3,700 feet in length to be oriented along a 080-degree and 260-degree heading and a 4,300-foot long crosswind runway oriented along a 130-degree and 310-degree heading. Associated with the approved airfield, the Development Order also designated levels of development associated with a number of ancillary support facilities including hangars, based aircraft, fuel farm, and administrative/office space. The nature of the language contained in the Development Order is such as to clearly and specifically limit the airfield development actions to a specified orientation for each runway alignment. Additionally, the Development Order requires that any instrument landing system installed to support instrument approaches be developed to support landings only from the west. Finally, Runway 13-31 is designated as the preferred runway for nighttime operations (operations between 10 p.m. and 7 a.m.).

Within the Development Order, there are several requirements that both require the development of, and guide the use of, two major environmental preserve areas identified as Preserve A and Preserve B. These areas encompass 788 acres and 137 acres, respectively. As noted in the Development Order, these preserves "shall be established in perpetuity." Additional provisions within the Development Order specifically restrict the activities that can occur within the limits of the preserves, noting that "any use of the preserves shall be consistent with: 1.) preserving their values as a remnant of undeveloped Florida." These preserves are situated immediately off the east and west ends of parallel Runways 8R-26L and 8L-26R. The location of the preserves and their protection in perpetuity, in conjunction with manmade facilities east of the airport, effectively preclude the ability to consider the extension of either parallel runway beyond its current length.

4.2.2 Manmade Development Constraints

Several manmade facilities also act to limit or render more difficult the ability to extend a runway at NCO to meet future demand. NCO is bordered along its entire northeast property limit by the CSX railroad and by the alignment of SR 710, commonly known as the Bee Line Highway. The proximity of these two key transportation facilities, along with FAA requirements for maintaining vertical clearance over rail and roadway facilities, impact the ability to consider any extension of Runway 8L-26R. The cost of attempting to undertake a massive relocation of the CSX rail line and the alignment of SR 710 eastward to provide for an extension of Runway 8L-26R would be extremely high and of questionable viability. Additionally, such relocation would necessitate the placement of both the roadway and the rail line inside the limits of the Loxahatchee Slough Preserve, impacting a significant quantity of the preserve. The impacts of the extensive rail and roadway relocation on the preserve are likely to be deemed unacceptable by the community or the permitting agencies solely for the purposes of accommodating a runway extension.

The location of the airport access roadway to the north of the developed airfield and, specifically, beneath the extended centerline of Runway 31 is a minimal concern, but is one that does need to be noted as being potentially impacted if Runway 13-31 were to be extended. Given the pending improvements to PGA Boulevard to the south of the Airport being planned in association with the development of the Palm Beach County Technology Park, impacting the existing access roadway may be rendered moot.

The noted development of the PGA Boulevard extension to serve the Technology Park west of the airport is a significant man-made issue that could affect airfield development alternatives. Currently, there are two potential alignments for this proposed roadway extension in the vicinity of the southern boundary of the airport property. The first PGA Boulevard option (for this analysis referred to as Option One) consists of a straight roadway alignment located approximately 250 feet south of, and parallel to, most of the current south airport property limits. This alignment would adversely impact Runway 13-31 and potentially necessitate the shifting of the runway threshold north of its current position, resulting in the need to replace lost runway length or to actually shorten the available runway. The second PGA Boulevard alignment option (Option Two) is located to the south of Option One and involves a curved section of roadway that extends almost entirely around the end of the existing Runway 31 RPZ, remaining outside of existing Airport property. Option Two does not result in an impact to the current threshold of Runway 31; however, it would effectively preclude the viability of any southerly extension of Runway 13-31.

4.2.3 Major Environmental Features

From a natural environment perspective, the airfield is entirely surrounded by wetlands. The Sweetbay natural area, which encompasses 788 acres west of the parallel runways and Runway 13-31, and a 137-acre area in the southeast corner of the Airport property are, as noted earlier, environmental preserve areas established in 1990 by the DOA per conditions of the approved airport development order.[3]

The Loxahatchee Slough natural area, which extends north and south of the intersection of the Bee Line Highway and PGA Boulevard, as well as bordering the southern boundary of the Airport property, was purchased by Palm Beach County in 1996 and is, according to Department of Environmental Resources Management, the largest and most diverse natural area owned by Palm Beach County. The location of he Loxahatchee Slough natural area would impact the ability to extend Runway 8L-26R to the east. It would also affect the viability of a southerly extension of Runway 13-31. Additional wetlands have been inventoried north of Runway 8L-26R alignment. These wetland areas are located off of the current end of Runway 13-31 as well as to the north and northeast of the threshold of Runway 13 out to the alignment of the airport access roadway. Additional isolated wetlands are located between the alignment of the CSX railroad and the airport access roadway. However, these wetlands are not located within any of the Palm Beach County preserved natural areas. The environmental impacts that might result from a runway extension at NCO on these wetlands would require mitigation.

4.2.4 Summary of the Impact of Factors Influencing Development Alternatives

Based on the preceding information, it is evident that development of airfield alternatives to meet the identified need for a 6,000-foot-long runway at NCO is limited. The location of the two on-airport environmental preserves and their protection in perpetuity removes consideration of Runway 8R-26L as a potential option for runway lengthening. The western on-airport preserve, coupled with the CSX railroad, SR 710, and the Loxahatchee Slough Natural Area, preclude the viability of an extension of Runway 8L-26R. Thus, the only viable alternative for addressing the

[3] Source: Palm Beach County, Department of Environmental Resources Management.

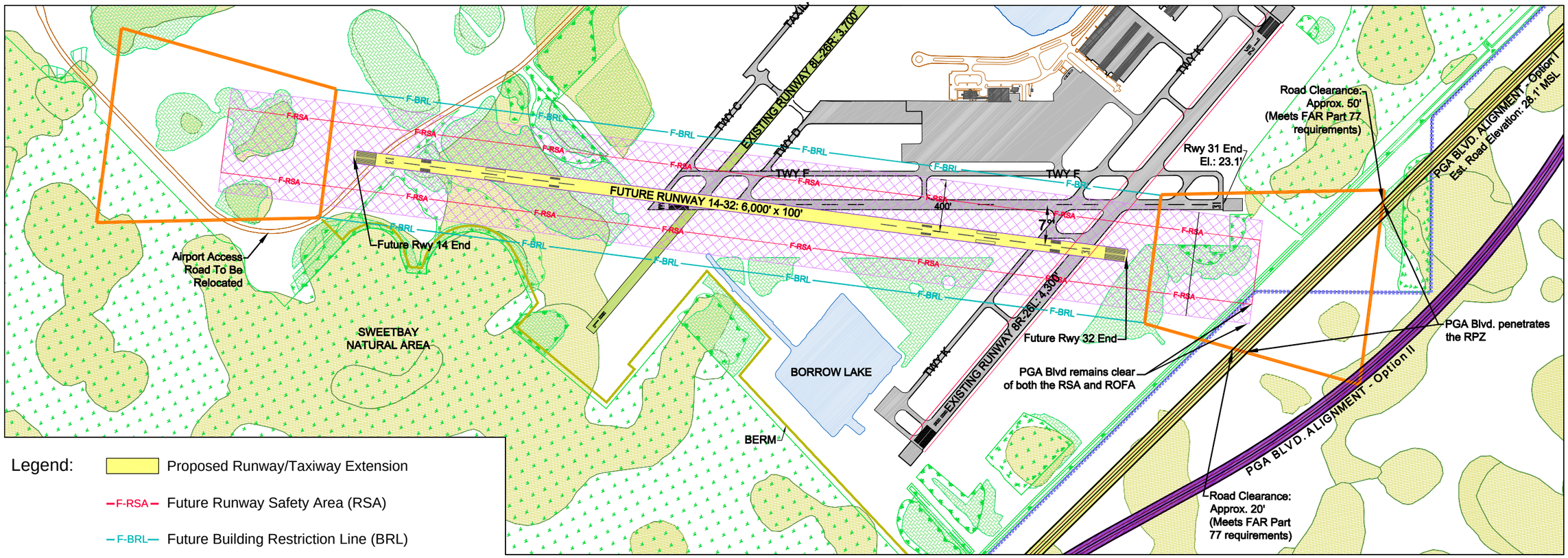
need for additional runway length at NCO has to involve the crosswind runway. From a wind coverage standpoint, Runway 13-31 provides crosswind coverage comparable to Runway 8R-26L, and therefore is a viable alternative for extension. Finally, the development of alternatives involving Runway 13-31 or some similar alignment are influenced by the proposed extension of PGA Boulevard and the wetlands located to the north of the existing threshold of Runway 13. The extent to which these factors affect alternatives are addressed in the following discussion.

Three alternative runway configurations were developed that would provide for the development of a 6,000-foot-long runway at NCO based on the alignment of Runway 13-31. The first option consists of realigning Runway 13-31 to a 14-32 heading, then constructing a 6,000-foot-long runway to replace the existing alignment of Runway 13-31. The two remaining alternatives involve northerly extensions to existing Runway 13-31 to provide 6,000 total feet of runway, but the alternatives vary depending on which one of the future PGA Boulevard alignments is selected for development. The runway alternatives were evaluated based on the following objectives and needs:

- Adherence, to the extent feasible, to the Development Order provisions
- Conformance to FAA design and safety standards
- To the maximum extent feasible, keep the RPZ's clear of unacceptable uses, activities, and roadways
- Provide the identified takeoff runway length of 6,000 feet
- Avoid, to the extent feasible, community impacts
- Minimize impacts to the environment
- Consider construction-related requirements and issues associated with the proposed runway options
- Take into consideration planned roadway improvement projects in the vicinity of the Airport (e.g. PGA Boulevard)

4.3 Alternative A – Realign and Construct Runway 13-31

Alternative A, illustrated in Exhibit 4-1, consists of the realignment of Runway 13-31 to a new compass heading of 14-32. As shown, this would shift the southern end of the runway to the west/northwest of its current position by approximately 820 feet, assuming roadway Option 1 were to be developed. If roadway Option 2 were selected, the south end of the realigned runway could be shifted to the south with placement of the threshold occurring approximately 520 feet to the west of the current Runway 31 threshold. Regardless of which PGA Boulevard alternative is ultimately selected, Runway Alternative A would result in the development of a completely new 6,000-foot runway at NCO, along with the need to construct a full-length parallel taxiway. This development scheme focuses on how improvements could be made to the existing runway while avoiding construction impacts on neighboring natural areas. The berm that runs west of the Runway 13-31 existing alignment, separating the Sweetbay natural area from the current airfield, served as the reference point for the determination of the new alignment. The ROFA and RSA associated with Runway 13-31's new alignment both lie east of the berm.



Legend:

- Proposed Runway/Taxiway Extension
- F-RSA — Future Runway Safety Area (RSA)
- F-BRL — Future Building Restriction Line (BRL)
- Runway Object Free Area (ROFA)
- Runway Protection Zone (RPZ)
- Proposed PGA Blvd R.O.W. Alternative I
- Proposed PGA Blvd R.O.W. Alternative II
- Airport Boundary
- Florida Managed Areas
- Wetlands (National Wetlands Inventory [Dec 1992])
- Photo-Interpreted Wetlands (April 2005)

Notes:

1) Federal Aviation Administration (FAA) Order 5200.8, Runway Safety Area Program, establishes Runway Safety Area (RSA) standards. The RSA is the strictest standard defined by the FAA and cannot be waived. It provides a measure of enhanced safety in the event an aircraft overshoots, undershoots, or veers off the runway.

2) FAA Advisory Circular (AC) 150/5300-13, Change 8, *Airport Design,* contains the FAA standards for the design of civil airports. The AC establishes the size of the RSA, Runway Object Free Area (ROFA), and Runway Protection Zone (RPZ) based on the characteristics of the aircraft expected to regularly use the Airport, and the minimums associated with the best instrument approach to the runway.

Like FAA Order 5200.8, AC 150/5300-13 requires a 400- or 500- foot wide RSA centered on the runway centerline and extending 1,000 feet beyond each runway end for Approach Category C and Design Group II aircraft. Similarly, it requires an 800-foot wide ROFA centered on the runway centerline and extending 1,000 feet beyond each runway end.

3) Federal Aviation Regulation (FAR) 49 CFR Part 77 establishes standards and notification requirements for objects affecting navigable airspace. FAR Part 77 requires a minimum of 15 feet vertical clearance between approach surfaces to runways and a non-interstate public roadway, such as PGA Boulevard.

Prepared by: Ricondo & Associates, Inc.

Exhibit 4-1

0 800 ft.

north

Alternative A

A second basis for Alternative A is to minimize the future effect that implementing ARC C-II criteria could have on the existing ramp areas. At the point in time when full conformity with C-II design standards is required, the RSA and ROFA requirements increase, as will the runway to parallel taxiway separation requirements. These changes will adversely impact the available ramp area in front of the FBO and will require Taxiway F to be relocated 60 feet to the east to meet design standards. By realigning Runway 13-31, the impact of the C-II criteria is avoided and some additional area in front of the FBO would become available for aircraft ramp and parking. As noted, the placement of the threshold on the south end of the runway would dependent on the alignment that is ultimately selected for future PGA Boulevard, although the best option would be associated with the alignment shown in roadway Option 2.

Alternative A would require the relocation of the airport entrance roadway and would also impact approximately 26 acres of wetlands that were identified through photo-interpretation in April of 2005. Most of the impacted wetlands are located along the northern third of the relocated runway, between Runway 8L-26R and the airport access roadway. None of the impacted wetlands would be located within any of the identified preserve areas on or adjacent to NCO.

Strengths:

- No impacts to any of the environmental preserves.
- PGA Boulevard Options 1 and 2 could remain clear of the Runway 13-31 ROFA and RSA, although Option 2 is far preferable from an airport perspective.
- A vertical clearance of 15 feet is provided between the Runway 31 approach and PGA Boulevard.
- The alternative mitigates potential future effects on ramp area stemming from implementation of C-II standards.

Weaknesses:

- The alternative requires the construction of a full 6,000 feet of runway along with a parallel taxiway with properly located exits and installation of lighting.
- Construction costs associated with this alternative are considerably higher than other options.
- Large areas must be graded and cleared to accommodate the proposed RSA and ROFA.
- The alternative impacts an estimated 26 acres of wetlands.
- The alternative does not adhere to the approved Development Order with regard to the approved orientation of the crosswind runway alignment.
- The decentralization of the runway relative to existing landside facilities and aircraft ramp increases the taxi time for aircraft departing on Runway 13.
- Northeast expansion of the existing ramp is limited by the ROFA associated with the proposed runway. Only sections of the area south of existing Taxiway D, east of Taxiway F, and northeast of the main ramp can be developed.
- The alternative requires acquisition of additional land or of an avigation easement along the southern boundary of the airport for the shifted RPZ.

4.4 Alternative B – Extend and Shift Runway 13-31

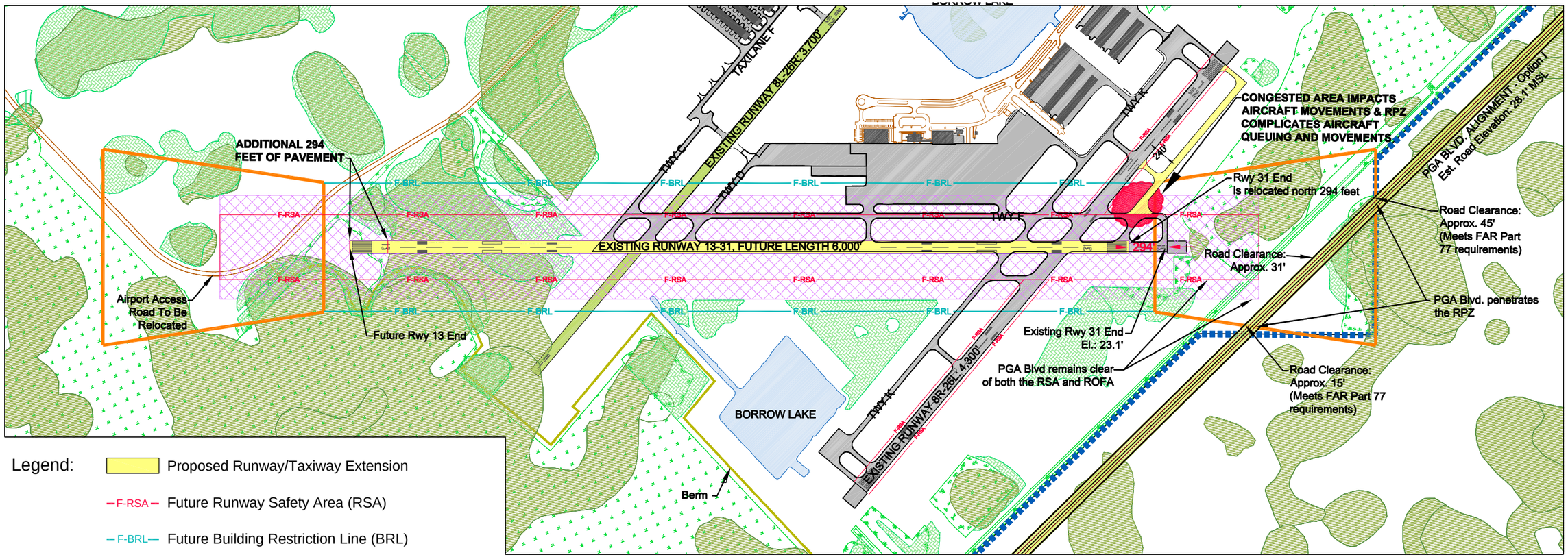
As shown in Exhibit 4-2**,** Alternative B assumes that PGA Boulevard Option 1 (the straight alignment) will be the selected roadway option. With the future change in ARC to C-II planning, development for a proposed extended runway would have to ensure conformity with the provision of a 500-foot wide RSA and the RSA extending 1,000 feet beyond each runway end, along with a ROFA that would be 800 feet wide and also would extend 1,000 feet beyond each runway end. These safety areas and the need to maintain a 15-foot vertical clearance in the approach to Runway 31 over future PGA Boulevard would require the shifting of the Runway 31 threshold 294 feet to the northwest of its current position. The runway would be extended to provide a fully usable runway length of 6,000 feet for landings in both directions and for departures in the Runway 13 direction, while departures in the Runway 31 direction would have 6,294 feet of available length. To accomplish this, an extension of 1,924 feet beyond the current northwest end of the runway would be required.

Strengths:

- PGA Boulevard Option 1 would remain clear of the Runway 13-31 ROFA and RSA.
- A vertical clearance of 15 feet would be provided between the Runway 31 approach and PGA Boulevard Option 1 with the northwesterly shift of the runway.
- The alternative would provide additional takeoff length for northwesterly aircraft departures.
- Alternative B would reduce construction costs significantly below those associated with Alternative A by requiring new construction of 1,924 feet of additional runway length versus 6,000 feet, as required in the first option.
- Alternative B would impact 13 fewer acres of wetlands than would Alternative A.

Weaknesses:

- The 294-foot northwesterly relocation of Runway 31 threshold creates congestion for staging of aircraft adjacent to the Runway 31 threshold given the proximity of the relocated Runway 31 end to the Runway 8R-26L's safety area; an extremely limited amount of space is available for aircraft queuing and staging.
- Aircraft must taxi though Runway 31 RPZ to get to Runway 31, further adversely impacting the efficiency and ability to queue aircraft departing on Runway 31.
- To allow for the need to queue aircraft, a portion of a parallel taxiway along the south side of Runway 8R-26L will need to be constructed for efficient aircraft movements and to minimize potential runway incursions.
- Taxi time for aircraft departing on Runway 31 is increased because aircraft have to be staged along the south parallel taxiway to Runway 8R-26L, so they must taxi on both Taxiways F and K before they can access the south parallel taxiway. The lack of staging areas between Runway 8R-26L safety area edge and the Runway 31 threshold significantly increases aircraft taxi time, which, in turn, increases fuel consumption and aircraft operating costs.



Legend:

- Proposed Runway/Taxiway Extension
- F-RSA — Future Runway Safety Area (RSA)
- F-BRL — Future Building Restriction Line (BRL)
- Runway Object Free Area (ROFA)
- Runway Protection Zone (RPZ)
- Proposed PGA Blvd R.O.W. Alternative I
- Proposed PGA Blvd R.O.W. Alternative II
- Airport Boundary
- Florida Managed Areas
- Wetlands (National Wetlands Inventory [Dec 1992])
- Photo-Interpreted Wetlands (April 2005)

Notes:

1) Federal Aviation Administration (FAA) Order 5200.8, Runway Safety Area Program, establishes Runway Safety Area (RSA) standards. The RSA is the strictest standard defined by the FAA and cannot be waived. It provides a measure of enhanced safety in the event an aircraft overshoots, undershoots, or veers off the runway.

2) FAA Advisory Circular (AC) 150/5300-13, Change 8, *Airport Design,* contains the FAA standards for the design of civil airports. The AC establishes the size of the RSA, Runway Object Free Area (ROFA), and Runway Protection Zone (RPZ) based on the characteristics of the aircraft expected to regularly use the Airport, and the minimums associated with the best instrument approach to the runway.

Like FAA Order 5200.8, AC 150/5300-13 requires a 400- or 500- foot wide RSA centered on the runway centerline and extending 1,000 feet beyond each runway end for Approach Category C and Design Group II aircraft. Similarly, it requires an 800-foot wide ROFA centered on the runway centerline and extending 1,000 feet beyond each runway end.

3) Federal Aviation Regulation (FAR) 49 CFR Part 77 establishes standards and notification requirements for objects affecting navigable airspace. FAR Part 77 requires a minimum of 15 feet vertical clearance between approach surfaces to runways and a non-interstate public roadway, such as PGA Boulevard.

Prepared by: Ricondo & Associates, Inc.

Exhibit 4-2

0 800 ft.

north

Alternative B

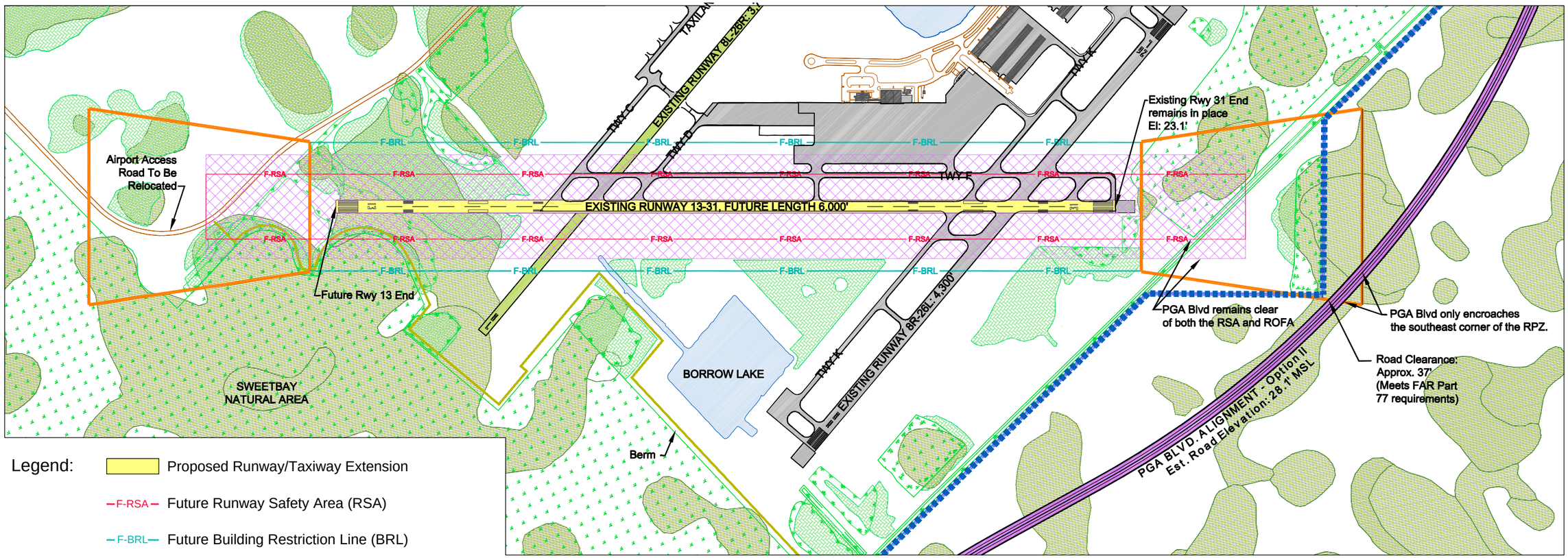
- The efficiency of the future south parallel taxiway to Runway 8R-26L is significantly degraded by its use as a staging point for aircraft operating on Runway 13-31. Aircraft waiting on the parallel to use Runway 13-31 block the ability of other aircraft using this taxiway for movements to and from the thresholds of Runway 8R-26L.
- The need to construct an additional 294 feet of runway to provide the full 6,000-foot runway capability and the need to construct a portion of the parallel taxiway along the south side of Runway 8R-26L increases the cost of airport development; this increase is directly related to PGA Boulevard Option 1 impacts.
- Alternative B requires the reconfiguration of existing airfield lighting on Runway 13-31, including relocation of runway threshold lights, runway lights, and taxiway lights, with an associated increase in development costs.
- The relocation of the Runway 31 threshold will require the relocation of airfield signs and the eradication of existing runway markings and their replacement based on the new runway threshold location.
- Future C-II criteria would have an adverse effect on the currently available ramp areas, resulting in the reduction of the available parking space in the front of the FBO.
- RPZ and ROFA would require some limited tall vegetation removal in the western preserve.
- RSA impacts 1.27 acres of the western 788-acre Sweetbay preserve.
- Alternative B impacts an estimated 13 acres of wetlands.

4.5 Alternative C – Extend Runway 13-31

This alternative leaves the current threshold of Runway 31 in its existing position and the alignment of PGA Boulevard is shifted to the south, conforming to the alignment shown as PGA Boulevard Option 2 and depicted in Exhibit 4-3. To meet the anticipated need for a 6,000-foot-long runway at NCO, Runway 13-31 would be extended 1,700 feet off of the current northwest end of the runway. No extension or expansion would occur to the south except for the grading improvements necessary to provide for the required runway safety area for ARC C-II (1,000 feet beyond the runway end and 500 feet in width). This would necessitate the placement of a culvert enclosure for the C-18 canal, which would be required under all of the alternatives. Some clearing could also be required to conform to the requirements of the ROFA, which were described previously in this document. The following includes a listing of attributes and impacts related to Alternative C as presented in Exhibit 4-3.

Strengths:

- PGA Boulevard (Option 2) remains clear of the Runway 13-31 ARC C-II RSA and ROFA.
- The ARC C-II RSA and ROFA remain totally within existing airport property
- The alignment of PGA Boulevard Option 2 provides the required 15-foot clearance in the future 34:1 approach surface to Runway 31.
- PGA Boulevard only encroaches on the southwest corner of Runway 31 RPZ.



Legend:

- Proposed Runway/Taxiway Extension
- F-RSA — Future Runway Safety Area (RSA)
- F-BRL — Future Building Restriction Line (BRL)
- Runway Object Free Area (ROFA)
- Runway Protection Zone (RPZ)
- Proposed PGA Blvd R.O.W. Alternative I
- Proposed PGA Blvd R.O.W. Alternative II
- Airport Boundary
- Florida Managed Areas
- Wetlands (National Wetlands Inventory [Dec 1992])
- Photo-Interpreted Wetlands (April 2005)

Notes:

1) Federal Aviation Administration (FAA) Order 5200.8, Runway Safety Area Program, establishes Runway Safety Area (RSA) standards. The RSA is the strictest standard defined by the FAA and cannot be waived. It provides a measure of enhanced safety in the event an aircraft overshoots, undershoots, or veers off the runway.

2) FAA Advisory Circular (AC) 150/5300-13, Change 8, *Airport Design,* contains the FAA standards for the design of civil airports. The AC establishes the size of the RSA, Runway Object Free Area (ROFA), and Runway Protection Zone (RPZ) based on the characteristics of the aircraft expected to regularly use the Airport, and the minimums associated with the best instrument approach to the runway.

Like FAA Order 5200.8, AC 150/5300-13 requires a 400- or 500- foot wide RSA centered on the runway centerline and extending 1,000 feet beyond each runway end for Approach Category C and Design Group II aircraft. Similarly, it requires an 800-foot wide ROFA centered on the runway centerline and extending 1,000 feet beyond each runway end.

3) Federal Aviation Regulation (FAR) 49 CFR Part 77 establishes standards and notification requirements for objects affecting navigable airspace. FAR Part 77 requires a minimum of 15 feet vertical clearance between approach surfaces to runways and a non-interstate public roadway, such as PGA Boulevard.

Prepared by: Ricondo & Associates, Inc.

Exhibit 4-3

0 800 ft.

north

Alternative C

- Sufficient room is provided between Runway 8R-26L edge and Runway 31 end to queue aircraft waiting to depart Runway 31 without having to construct additional taxiways and without necessitating aircraft to pass through an RPZ.
- Alternative C does not require changes to existing runway markings or runway/taxiway lighting on the Runway 31 end.
- Alternative C would not require the possible relocation of the Precision Approach Path Indicator system on Runway 31 and the REILs on Runway 31.
- Alternative C does not trigger the need to implement declared distances on Runway 13-31 with the associated reduction in landing length on Runway 13 and 31 and takeoff distance on Runway 13.
- Alternative C requires the least amount of construction of the available options reviewed.
- The cost of development is anticipated to be less than for Alternatives A and B.

Weaknesses:

- PGA Boulevard Option 1 would penetrate the southwestern corner of the future non-precision approach RPZ.
- Alternative C would impact an estimated 12 acres of wetlands--one acre less than Runway Alternative B and 14 acres less than Runway Alternative A.
- RPZ and ROFA would require some limited tall vegetation removal in the western preserve.
- The RSA would impact 1.27 acres of the western 788-acre Sweetbay preserve.
- Alternative C would require acquisition of additional land or of an avigation easement along the southern boundary of the airport for the expanded RPZ on the south runway end.
- Future C-II criteria would have an adverse effect on the currently available ramp areas, resulting in the reduction of the available parking space in the front of the FBO.

4.6 Recommendation and Summary

The available alternatives for meeting the need for a 6,000-foot runway capability at NCO are significantly limited by the parameters of the airport development order, manmade improvements in the airport environs, and the natural environment around the airport. Because of these constraints, the only viable alternative for meeting the identified need is to enhance the capability of the crosswind runway. While Alternative A involving the realignment and construction of a new 6,000-foot runway avoids the minimal impacts on the adjacent preserves associated with Alternatives B and C, this option requires a costly design and construction effort and the complete abandonment of existing runway and taxiway pavements. The cost of this option essentially precludes the viability of its implementation.

Likewise, Alternative B, the option to provide the ultimate length of 6,000 feet by extending and shifting Runway 13-31 in order to provide adequate vertical clearance between the straight alignment of PGA Boulevard and the Runway 31 approach was not deemed viable. This alternative, which assumes that PGA Boulevard Option 1 (the straight alignment) is the selected

roadway option, would have an adverse impact to aircraft movements and operations, degrade the efficiency of the future south parallel taxiway to Runway 8R-26L, require the reconfiguration of the runway, result in a number of safety impacts to the Airport, and increase airport development costs, all of which combine to render this a highly undesirable alternative.

Therefore, Alternative C, which shows PGA Boulevard Option 2 as the selected roadway option and extends Runway 13-31 to the north while maintaining Runway 31 in place, is the preferred alternative, and the option that provides the most operationally efficient and cost-effective approach for the County. For the reasons already stated in this section, Alternative C has the smallest estimated construction costs for the DOA and results in limited operational restrictions during construction. Therefore, Alternative C is recommended as the preferred runway alternative for the long-term NCO development plan, as well as being the preferred recommendation to the PGA Boulevard design team for their planning and design purposes.

MAR-02-1990 02:44pm 90-062042
ORB 6373 Pg 565

NOTICE OF DEVELOPMENT ORDER ADOPTION

Please take notice that on February 22, 1990, the Board of County Commissioners of Palm Beach County adopted a Development Order under Section 380.06, Florida Statutes, which constitutes a land development regulation applicable the following described property with Palm Beach County, Florida:

See Exhibit "A" attached and made a part hereof.

The Development Order may be examined at the office of the Clerk of the Board of County Commissioners, Minutes Section, 301 N. Olive Avenue, West Palm Beach, Florida.

There have been no modifications to the Development Order as of the date this notice.

DATED this 2nd day of March, 1990.

Signed and sealed in our presence as witnesses:

PALM BEACH COUNTY
DEPARTMENT OF AIRPORTS

BY: Bruce Pelly

(SEAL)

STATE OF FLORIDA
COUNTY OF PALM BEACH

I HEREBY CERTIFY that on this day before me, an officer duly qualified take acknowledgements, personally appeared Bruce Pelly, as Director of the Palm Beach County Department of Airports, who executed the foregoing instrument and acknowledged before me that he executed the same for the uses and purposes therein expressed.

WITNESS my hand and official seal in the County and State last aforesaid 2nd day of March, 1990.

Notary Public

My Commission Expires:

Notary Public, State of Florida
My Commission Expires Oct. 30, 1992
Bonded Thru Troy Fain - Insurance Inc.

DESCRIPTION

All that portion of the Northwest One-Quarter (NW 1/4) of Section 1, Township 42 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

TOGETHER WITH all that portion of the Southwest One-Quarter (SW 1/4) of Section 1, Township 42 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

TOGETHER WITH all that portion of the Southeast One-Quarter (SE 14) of Section 1, Township 42 South, Range 41, East, lying Southwesterly of the South westerly right-of-way line of the Seaboard Airline Railroad

TOGETHER WITH all that portion of Section 2, Township 42 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

TOGETHER WITH all of Section 3, Township 42 South, Range 41 East;

TOGETHER WITH all that portion of the Northeast One-Quarter (NE 1/4) of Section 11, Township 42 South, Range 41 East, being more particularly described as follows:

COMMENCE at the Northeast corner of the said Northeast One-Quarter (NE 1/4);

THENCE on a grid bearing of N 89° 35′ 37″ W along the North line of the said Northeast One-Quarter (NE 1/4) a distance of 500.00 feet to the POINT OF BEGINNING;

THENCE S 45° 24′ 23″ W a distance of 1350.00 feet;

THENCE N 44° 35′ 37″ a distance of 1350.00 feet to a point on the North line of the said Northeast One Quarter (NE 1/4);

THENCE S 89° 35′ 37″ E along said North line a distance of 1909.19 feet to the POINT OF BEGINNING;

TOGETHER WITH all that portion of Section 34, Township 41 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

TOGETHER WITH all that portion of the Southwest One-Quarter (SW 1/4) of Section 35, Township 41 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

Said land situate within Palm Beach County, Florida, containing 1832.31 Acres, more or less.

EXHIBIT A

Return to: Robert D. Henderson Esq.
Nason Yeager et al
2000 Palm Beach Lakes Blvd #900
West Palm Beach FL 33409

TABLE 1: NORTH COUNTY GENERAL AVIATION AIRPORT DEVELOPMENT OF REGIONAL IMPACT PROJECT PHASING STATUS

PHASE/LAND USES	PROJECT STATUS				
Phase I: 1990-1995	Units or Square Footage Approved	Units or Square Footage Built	Units or Square Footage Under Construction	Date Completed/ To Be Completed	Special Notes
Approved Land Uses					
Residential					
Single Family	N/A				
Multifamily					
TOTAL					
Retail					
Specialty					
General	N/A				
TOTAL					
Office					
General	3150 s.f.	-0-	-0-	1992/93	
TOTAL					
Aviation					
Hangar					
T-Hangar	172,100 s.f.	-0-	-0-	1992/93	
Plane Ports					
Tie Down & Apron	56,870 s.y.	-0-	-0-	1992/93	
Runways					
	2 at 4300'	-0-	-0-	1992/93	
	1 at 3700'	-0-	-0-	1992/93	
Fuel Storage	7550 gal.	-0-	-0-	1992/93	

PERCENTAGE OF PHASE I COMPLETE: -0-

PERCENTAGE OF PHASE I UNDER CONSTRUCTION: -0-

TABLE 2: NORTH COUNTY GENERAL AVIATION AIRPORT DEVELOPMENT OF REGIONAL IMPACT COMPLIANCE WITH DEVELOPMENT ORDER

DO CONDITION	ACTIVITY TO BE COMPLETED	STATUS DATE COMPLETED	PROJECTED COMPLETION DATE	NOT APPLICABLE AT THIS TIME
2	Commence development within 4 years			Projected to commence 199
3	Commence construction of buildings within 30 days of clearing, grass north runway			Concurrent with constructi
4	Unconfined particulate control			Concurrent with constructi
5	Plant 50 acres of native plants			Concurrent with Phase I construction
8	Execute interlocal agreement			X
10	Replacement of 29 acres of wetland functions and values			X
11	Provide and delineate buffer prior to clearing within 100 feet			After permits issued, prio to construction
12	Establish and provide barrier, set preserve boundaries			After permits issued, prior to construction
12	Fence preserves A and B			Concurrent with constructi
13, 14	Prepare habitat management plan		4/91	
15	Prepare species protection plan		3/91	
17	Exotics eradication			Concurrent with Phase I construction
18	Drainage plan/ conceptual permit		3/91	
19	Wetland control elevation/ conceptual permit		3/91	
21	Littoral zone plan			After permits issued, prior to construction
22	Connect to municipal water service			X

DO'CONDITION	ACTIVITY TO BE COMPLETED	STATUS DATE COMPLETED	PROJECTED COMPLETION DATE	NOT APPLICABLE AT THIS TIME
23	Connect to municipal sewer			X
24	Xeriscape landscaping			Concurrent with construct
25	Water saving plumbing fixtures			Concurrent with construct
26	Hazardous materials management plan		6/91	
28	Fuel farm construction standards/permit		8/91	
29	Stormwater system design			Concurrent with SFWMD construction permit
30	Install surface and groundwater monitoring stations			Prior to construction
32	SWA commitment			X
33	Solid waste reduction/ recycling plan		5/91	X
34, 35	Energy conservation features			Concurrent with construct
36	Right-of-way commitment			Prior to construction
37	Contracts for intersection improvements			Prior to construction
38	Traffic monitoring			Phase II
39	Pay impact fee			
40	Traffic study			2005
42	Incorporate restrictions into leases			X
44	Land use compatibility measures			Area is to be annexed by Palm Beach Gardens
45	Police protection assurance			X

D.O. CONDITION	ACTIVITY TO BE COMPLETED	STATUS DATE COMPLETED	PROJECTED COMPLETION DATE	NOT APPLICABLE AT THIS TIME
46	Consult with police protection provider			X
47	Fire protection assurance			X
48	Consult with fire protection provider			X
49	Provide CFR site			X
50	Submit well/septic tank plans to Health Department			After permits issued, prior to construction
52	Provide/maintain landscape buffer			Concurrent with construct
53	Building site plan review			Concurrent with construct
56-67	Operational restrictions			X

TABLE 3: NORTH COUNTY GENERAL AVIATION AIRPORT APPLICATION FOR DEVELOPMENT APPROVAL COMMITMENTS

ADA Commitment	Phase	Completed	Under Construction	When Applicable
Included within D.O. Conditions, TABLE 2				

RESOLUTION NO. R-90-294

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF THE COUNTY OF PALM BEACH, FLORIDA, RELATING TO A DEVELOPMENT OF REGIONAL IMPACT KNOWN AS NORTH PALM BEACH COUNTY GENERAL AVIATION AIRPORT (THE "AIRPORT"); MAKING FINDINGS OF FACT AND CONCLUSIONS OF LAW PERTAINING TO THE AIRPORT, ESTABLISHING DEVELOPMENT LIMITATIONS, RESTRICTIONS AND CONDITIONS RELATING TO APPLICATIONS, COMMENCEMENT, AIR, HISTORIC AND ARCHEOLOGICAL SITES, HABITAT, VEGETATION AND WILDLIFE, DRAINAGE, WATER SUPPLY AND WASTEWATER, HAZARDOUS MATERIALS AND WASTE, SOLID WASTE, ENERGY, TRANSPORTATION, LAND USE COMPATIBILITY, POLICE AND PUBLIC SAFETY, AND FIRE PROTECTION, CONSTITUTING THIS RESOLUTION AS A DEVELOPMENT ORDER BY PALM BEACH COUNTY IN COMPLIANCE WITH LAW; PROVIDING AN EFFECTIVE DATE; PROVIDING A TERMINATION DATE; AND FOR OTHER PURPOSES.

* * *

WHEREAS, an Application for Development Approval for North Palm Beach County General Aviation Airport Development of Regional Impact, known as the "Airport" was originally submitted to the Treasure Coast regional Planning council on March 9, 1989, and was supplemented with additional information submitted June 6, 1989, and October 17, 1989, in accordance with Section 380.06(10), Florida Statutes; and

WHEREAS, the applicant, Palm Beach County Department of Airports, through its authorized agent, Bruce Pelly, proposes to construct a general aviation airport consisting of parallel east-west runways of lengths of 4300 feet and 3700 feet, a cross wind runway of a length of 4300 feet, 10,300 square feet of administration/office space, a fuel farm with 25,100 gallon capacity, 502,700 square feet of T-hanger and fixed base aircraft operation space, 500 fixed base aircraft, 200 acres of subsidiary development and airport related safety features and navigational aids constituting a Development of Regional Impact on approximately 1832 acres of property legally described in Exhibit "A", attached hereto, and located immediately west and north of the intersection of PGA Boulevard and Beeline Highway in Palm Beach County, Florida; and

WHEREAS, the Palm Beach County Department of Airports has filed with the PALM BEACH COUNTY an Application for Development Approval of a Development of Regional Impact under the provisions of Section 380.06, Florida Statutes; and

WHEREAS, the Board of County Commissioners as the governing body of Palm Beach County has jurisdiction pursuant to Chapter 380, Florida Statutes to authorize and consider applications for Development Approval for DevelopmentS of Regional Impact; and

WHEREAS, the public notice requirements of Palm Beach County and Section 380.06(11), Florida Statutes, have been satisfied and notice has been given to the Florida Department of Community Affairs, Treasure Coast Regional Planning Council, and the South Florida Water Management District; and

WHEREAS, the County and the Treasure Coast Regional Planning Council have considered the application, as submitted and as subsequently supplemented, and found it to be in compliance with applicable law; and

WHEREAS, the Board of County Commissioners, on February 22, 1990, held a duly noticed public hearing on the Development of Regional Impact Application for Development Approval, and has heard and considered the testimony taken and the reports,

recommendations, exhibits, and other documentary evidence submitted at the public hearing; and

WHEREAS, the Board of County Commissioners has received and considered the report and recommendations of the Treasure Coast Regional Planning Council; and

WHEREAS, the Board of County Commissioners has made the findings of fact and conclusions of law hereinafter set forth with regard to the Application for Development Approval and has entered the following order; and

WHEREAS, the County, having considered all of the foregoing and being fully advised and informed in the premises, has determined that it is in the best interests of the citizens of Palm Beach County to approve a Development Order for the property which is the subject of the aforementioned Application for Development Approval, subject to specified conditions and limitations.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF PALM BEACH COUNTY, FLORIDA, IN A PUBLIC MEETING, DULY CONSTITUTED AND ASSEMBLED THIS 22 DAY OF FEBRUARY 1990, that:

SECTION 1: The Board of County Commissioners hereby makes the following

FINDINGS OF FACT:

1. The Palm Beach County Department of Airports (the "Developer") has filed with PALM BEACH COUNTY, FLORIDA (the "County") an Application for Development Approval for a Development of Regional Impact ("North Palm Beach County General Aviation Airport DRI Application for Development Approval") pursuant to provisions and requirements of Section 380.06, Florida Statutes.

2. Copies of the North Palm Beach County General Aviation Airport DRI Application for Development Approval were submitted to the TREASURE COAST REGIONAL PLANNING COUNCIL ("TCRPC") and the DEPARTMENT OF COMMUNITY AFFAIRS OF THE STATE OF FLORIDA ("DCA") pursuant to Section 380.06(10)(a), Florida Statutes, March 9, 1989.

3. On May 25, 1989 and July 10, 1989, the TCRPC requested additional information in writing from the Developer and additional information was filed on June 6, 1989, and October 17, 1989.

4. The North Palm Beach County General Aviation Airport DRI Application for Development Approval, as supplemented, seeks development approval for approximately 1832 acres of real property (hereinafter "Airport") which is legally described in Exhibit A, attached hereto and incorporated herein.

5. The County has given notice that the proposed development is undergoing development of regional impact review.

6. The County has given notice and held a public hearing to consider the Airport DRI Application for Development Approval in accordance with Section 380.06(11) and the Zoning Code of the County.

7. On January 19, 1990, TCRPC submitted its report and recommendation on the regional impact of the proposed DRI.

8. The proposed development is not in an Area of Critical State Concern, designated pursuant to the provisions of Section 380.06, Florida Statutes.

9. The proposed development is in the public interest and will advance the goal of public safety by providing a means to separate commercial and general aviation operations at Palm Beach International Airport.

10. Provided the developer complies with the conditions of approval contained in this Development Order, the development of the Airport, in accordance with the Airport DRI Application for Development Approval, does not unreasonably interfere with the achievement of the objectives of the State Land Development Plan.

11. Provided the developer complies with the conditions of approval contained in this Development Order, the development of the Airport, in accordance with the Airport DRI Application for Development Approval is consistent with the State Comprehensive Plan.

12. Provided the developer complies with the conditions of approval contained in this Development Order, the development of the Airport, in accordance with the Airport DRI Application for Development Approval is consistent with the County's comprehensive plan, as amended, and land development regulations thereunder including, but not limited to, the County's Environmentally Sensitive Lands Ordinance.

13. Provided the developer complies with the conditions of approval contained in this Development Order, the development of the Airport, in accordance with the Airport DRI Application for Development Approval, is compatible with all surrounding land uses as designated in the County's comprehensive plan.

14. Provided the developer complies with the conditions of approval contained in this Development Order, the development of the Airport, in accordance with the Airport DRI Application for Development Approval, is consistent with the report and recommendations of the Treasure Coast Regional Planning Council submitted pursuant to Section 380.06(12), Florida Statutes, in that:

    A. Negative impacts of environmental, natural and historical resources will be minimal and these impacts will be minimized, eliminated or mitigated by compliance with the conditions of approval.

    B. The Airport development will have a positive impact on the economy of the region.

    C. There are adequate public facilities available or planned and funded to serve the development of the Airport in a safe and efficient manner, provided that such development is carried out in accordance with each and ever condition and limitation of this Development Order.

    D. Based on the transportation conditions of approval, Phases I-III of the Airport development will efficiently use transportation facilities. Development beyond Phase III is contingent on the transportation and transportation-related impacts being addressed through the substantial deviation process.

E. The demand on energy resources has been reduced through the conditions of approval.

SECTION 2: The Board of County Commissioners hereby makes the following

CONCLUSIONS OF LAW:

After having considered the Airport DRI Application for Development Approval, the report and recommendations of the TCRPC, the recommendations of the County's own professional staff, the opinion, advice and counsel of the public, and based on the above Findings of Fact, the Board of County Commissioners of the County hereby concludes that:

1. Provided the developer complies with the conditions of approval contained in this Development Order, the development of the Airport DRI Application for Development Approval complies with the requirements of Section 380.06(14) in that:

   A. The development proposed in the Airport DRI application for Development Approval will not unreasonably interfere with achievement of the objectives of the State Land Development Plan;

   B. The development proposed in the Airport DRI Application for Development approval is consistent and compatible with the Comprehensive Plan of the County as amended, and all applicable land development regulations adopted thereunder; and

   C. The development proposed in the Airport DRI Application for Development Approval is consistent with the report and recommendations of the TCRPC.

   D. The development proposed in the Airport DRI Application for Development Approval is consistent with the State Comprehensive Plan.

2. This Development Order supersedes any and all other Development Orders issued the County regarding the Airport pursuant to Section 380.06 or any other authority.

3. The Airport DRI Application for Development Approval and this Development Order has been considered and approved in accordance with each and every applicable requirement of Section 380.06.

SECTION 3: IN ACCORDANCE WITH THE PROVISIONS OF SECTION 380.06, FLORIDA STATUTES (1989), THE BOARD OF COUNTY COMMISSIONERS OF PALM BEACH COUNTY DOES HEREBY GRANT THIS DEVELOPMENT ORDER APPROVING THE AIRPORT DEVELOPMENT OF REGIONAL IMPACT, SUBJECT TO THE CONDITIONS, RESTRICTIONS AND LIMITATIONS HEREINAFTER SET FORTH.

APPLICATION FOR DEVELOPMENT APPROVAL

1. The North Palm Beach County General Aviation Airport Application for Development Approval is incorporated herein by reference. It is relied upon, but not to the

exclusion of other available information, by the parties in discharging their statutory duties under Chapter 380, Florida Statutes. Substantial compliance with the representations contained in the Application for Development Approval, as modified by Development Order conditions, is a condition for approval.

For the purpose of this condition, the Application for Development Approval shall include the following items:

A. Application for Development Approval dated March 9, 1989; and

B. Supplemental information dated June 6, 1989, and October 17, 1989, and a December 29, 1989, letter from Terry E. Lewis, representing the Palm Beach County Department of Airports, to Daniel M. Cary.

COMMENCEMENT OF DEVELOPMENT

2. In the event the developer fails to commence significant physical development within four years from the effective date of the Development Order, development approval shall terminate and the development shall be subject to further development-of-regional-impact review by the Treasure Coast Regional Planning Council pursuant to Section 380.06, Florida Statutes. For the purposes of this paragraph, physical development shall be deemed to have been initiated after placement of permanent evidence of a structure (other than a mobile home) on site, such as the pouring of slabs or footings, subgrade work for runways, taxiways or aprons; wetland creation; permanent roadways; or any permanent work beyond the stage of excavation or land clearing.

AIR

3. With the exception of clearing for access roads, survey lines, construction trailers, equipment staging areas, and fencing work, construction of buildings, runways, taxiways, and aprons, shall commence within 30 days after completion of clearing and grading for specific building sites, runways, taxiways, aprons and clear zones. Clear zones or areas around runways, taxiways, and aprons necessary to be cleared to comply with Federal Aviation Administration (FAA) safety regulations and the north parallel runway shall be immediately grassed 30 days after establishment of finished grade.

4. During land clearing and site preparation, wetting operations or other soil treatment techniques appropriate for controlling unconfined particulate, including grass seeding and mulching of disturbed areas, shall be undertaken and implemented by the developer to comply with Palm Beach County Public Health Unit and the Florida Department of Environmental Regulation air quality standards.

5. Following removal of exotics in the subsidiary development area, planting of a minimum of 50 acres in this area with native shrub and tree seedlings shall be instituted by the developer to ameliorate air quality impacts of the development and to provide a nursery for plant material to be utilized in landscaping the site. Planting shall occur prior to completing Phase I.

HISTORIC AND ARCHEOLOGICAL SITES

6. No clearing or other ground disturbance activities shall be undertaken in hammock areas identified on Exhibit HAS-1 of the Treasure Coast Regional Planning Council Assessment Report for the North Palm Beach County General Aviation Airport Development of Regional Impact.

7. In the event of discovery of any archeological artifacts during project construction, the developer shall stop construction in that area and immediately notify the Division of Historical Resources, Florida Department of State.

WETLANDS

8. Preserves A and B, encompassing approximately 788 and 137 acres respectively (as shown on Exhibit HVW-2 of the Treasure Coast Regional Planning Council Assessment report for the North Palm Beach County General Aviation Airport Development of Regional Impact), shall be established in perpetuity. Perpetual preservation of Preserves A and B shall be guaranteed by an interlocal agreement or other instrument acceptable to the Treasure Coast Regional Planning Council and South Florida Water Management District in consultation with the Florida Department of Environmental Regulation, Florida Game and Fresh Water Fish Commission, and U.S. Fish and Wildlife Service. The instrument assuring preservation is to be recorded within 120 days of when the berm(s) surrounding Preserves A and B have been constructed. No construction shall take place in the preserves other than that necessary to: 1) carry out the approved management plan; 2) build roadways as shown in Exhibit HVW-2; 3) construct necessary navigation aids required by the FAA; 4) conduct clear zone maintenance; and 5) implement the following design criteria which shall apply to Preserve A:

   A. Sufficient culverts shall be installed underneath the perimeter/safety road between the preserve area in Section 3 and the preserve area of Section 34 to re-establish historical wetland connections between those Sections.

   B. Sufficient culverts shall be installed underneath the safety/access road encircling the clear zone of runway 8R-26L to maintain existing hydrological connections between the preserved wetlands within Section 3.

   C. The berm which encloses the preserve area in Section 34 shall be repaired and maintained so that there is no outfall from the preserve except at 100-year flood stage.

   D. The entire preserve area shall be enclosed either by perimeter road or berm as shown in Exhibit HVW-2 to prevent outfall except at 100-year flood stage.

   E. No runoff from the developed portion of the site shall be pumped into Preserve A.

   The above criteria shall be provided for in South Florida Water Management District applications for conceptual, construction, and operation permits and permits issued for the property as allowable under Chapter 373, Florida Statutes.

9. Any use of the preserves shall be consistent with: 1) preserving their values as a remnant of undeveloped Florida; and 2) implementation of the approved preserve management plan. No off-road vehicle use shall be allowed except for emergency access or in carrying out prescribed management efforts. No hunting, trapping, or collecting will be allowed except for scientific purposes.

10. Prior to destruction of more than 33 acres of wetlands identified on Exhibit HVW-2 of the Treasure Coast Regional Planning Council Assessment Report for the North Palm Beach County General Aviation Airport Development of Regional Impact, 29 acres of wetland functions and values must have been shown to be completely and fully replaced. Plans for replacement of wetland functions and values which may include enhancement of existing on-site wetlands, wetland creation, or other innovative techniques, shall be approved by Treasure Coast Regional Planning Council and South Florida Water Management District in consultation with U.S. Fish and Wildlife Service, Florida Game and Fresh Water Fish Commission, U.S. Army Corps of Engineers, and the Florida Department of Environmental Regulation. The determination of whether the functions and values of wetlands to be destroyed have been completely and fully replaced shall be made by the Treasure Coast Regional Planning Council, in consultation with the above noted agencies. Exceptions to allow elimination of more than 33 acres of wetlands prior to replacement may be granted to the extent that it is demonstrated to the satisfaction of the Treasure Coast Regional Planning Council that: 1) sufficient financial and institutional ability is guaranteed to carry out the required replacement of wetland functions and values proposed to be eliminated; and 2) replacement will occur within a time period consistent with maintenance of current populations of species significantly dependent upon wetlands proposed to be eliminated.

    Reasonable guarantee of financial and institutional ability to carry out replacement of wetland function and values proposed in this manner can be provided by a surety bond, cash bond, or letter of credit from a financial institution; escrow agreements which include money, land, and improvements; or any combination thereof, in an amount appropriate as determined by Treasure Coast Regional Planning Council to implement the approved wetland mitigation and monitoring plan. The cost of plan review to Treasure Coast regional Planning Council shall be paid by the developer within 30 days of submission of evidence to the developer by Treasure Coast Regional Planning Council supporting the costs of review.

11. In addition to preserves A and B, 32 acres of wetlands identified on Exhibit HVW-2 of the Treasure Coast Regional Planning Council Assessment Report for the North Palm Beach County General Aviation Airport Development of Regional Impact shall be preserved. The developer shall provide and maintain a buffer zone of native upland edge vegetation around all preserved, restored, or created wetlands on site and all deepwater habitats which are constructed on site in accordance with the following provisions and consistent with FAA clear zone safety regulations. The buffer zone may consist of preserved or planted vegetation, but shall include canopy, understory, and ground cover of native species only. The edge habitat shall begin at the

upland limit of any wetland or deepwater habitat and shall include a total area of at least ten square feet per linear foot of wetland or deepwater habitat perimeter. This upland edge habitat shall be located such that no less than 50 percent of the total shoreline is buffered by a minimum width of ten feet of upland habitat. The upland buffer shall be clearly delineated and roped off prior to any land clearing within 100 feet of any wetland to be preserved or restored.

HABITAT PRESERVATION

12. Prior to issuance of a vegetation removal permit, the limits of the preserve area shall be established to the satisfaction of the Zoning Division and Environmental Resources Management Department. Temporary barriers shall be installed at preserved wetland or preserve boundaries by the developer prior to commencement of site clearing within 100 feet of such preserve boundaries. Such barriers shall be of a type that will clearly identify and designate the boundaries of the preserve or wetland areas during land clearing and construction. The perimeter of Preserves A and B shall be permanently fenced and posted with signs intended to discourage access. All permanent perimeter fencing of the preserves shall allow animals to access the preserves, but not airport development.

13. Prior to issuance of a building permit for the facility, the developer shall prepare a habitat management plan for Preserves A and B. This plan shall be approved by the Palm Beach County Zoning Division and Environmental Resource Management Department. At a minimum, the plan shall:

    A. Establish a schedule and method(s) for the removal of exotic vegetation.

    B. Provide for a controlled burning program. At a minimum the controlled burning program shall include: 1) objectives; 2) pre-burn considerations, including smoke management objectives; 3) the Northern Forest Fire Laboratory fuel model; 4) its prescription and range of suitable parameters; 5) a fire containment plan; 6) provisions that any burn will be conducted by or under the supervision of an experienced burn contractor or suitable public agency; and 7) a schedule or monitoring criteria that will determine the interval between burns. The burn program should simulate the historical fire pattern as closely as safety permits. Soil disturbance is to be minimized by utilizing natural fire breaks.

    C. Provide for the location and details of fencing and other means to discourage trespassing and allow animals ingress and egress.

    D. Address passive recreational or scientific uses consistent with preservation of the ecological integrity of the preserves and compatible with airport operations.

    E. Address continued wetland viability.

    The cost of habitat management of the preserves shall be the responsibility of the developer. The cost of plan review to Treasure Coast Regional Planning Council

shall be paid by the developer within 30 days of submission of evidence to the developer by the Treasure Coast Regional Planning Council supporting the costs of review.

14. The habitat management plan required for Preserves A and B must be approved by the Treasure Coast Regional Planning Council in consultation with Florida Game and Fresh Water Fish Commission and U.S. Fish and Wildlife Service before commencing construction of any runways, taxiways, aprons, fixed base operation structures, or other airport related facilities.

SPECIES OF SPECIAL REGIONAL CONCERN

15. Prior to commencement of clearing activities on any portion of the airport site, the developer must prepare and have approved a plan for surveying for, and protecting *in situ*, or relocating into a suitable on-site or off-site preserve area, all plants and animals of special regional concern that are determined to exist on or be "significantly dependent" upon (see Species of Special Regional Concern, Treasure Coast Regional Planning Council Assessment Report for North Palm Beach County General Aviation Airport) parcels to be developed. The plan shall be approved by Treasure Coast Regional Planning Council in consultation with the Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service. After approval of the plan, specific parcels may be cleared and developed subject to compliance with the methods and procedures stated in the plan. The cost of plan review to Treasure Coast Regional Planning Council shall be paid by the developer within 30 days of submission of evidence to the developer by Treasure Coast Regional Planning Council supporting the costs of review. The annual report required by Section 380.06, Florida Statutes, shall include a summary of survey and relocation efforts prepared by a qualified biologist.

16. In the event that it is determined that any additional representative of a plant or animal species of special regional concern (as defined in the Treasure Coast Regional Planning Council Assessment Report for North Palm Beach General Aviation Airport) is resident on, or otherwise is "significantly dependent upon" (see Species of Special Regional Concern, Treasure Coast Regional Planning Council's Assessment Report for North Palm Beach County General Aviation Airport) the airport property, the developer shall cease all activities which might negatively affect that individual population and immediately notify Treasure Coast Regional Planning Council. Proper protection, to the satisfaction of Treasure Coast Regional Planning Council in consultation with the U.S. Fish and Wildlife Service and the Florida Game and Fresh Water Fish Commission, shall be provided by the developer.

EXOTIC SPECIES

17. Melaleuca, Brazilian pepper, Australian pine, and Downy myrtle which occur on the site shall be removed entirely concurrent with Phase I construction. Removal shall be in such a manner that avoids seed dispersal of any of these species. In areas of high concentration, the exotic species shall be cleared and burned as close to the area in which they were removed as possible to avoid seed scatter. In areas of low concentration, or single individuals, the exotic species shall be killed by herbicide and ultimately cut and removed after the

total kill has been completed. There shall be no planting of these species on site. The project site shall be maintained to assure removal of volunteer exotic species as necessary.

DRAINAGE

18. The developer shall design and construct a stormwater management system to retain the maximum volume of water consistent with providing flood protection. At a minimum, the system shall be designed so that: 1) development of the airport will not result in the loss of storage in the C-18 Basin; 2) discharge from the site shall not negatively impact lands along the flow route to the Loxahatchee Slough; 3) the quality and quantity of water discharged from the site shall not adversely affect the Loxahatchee Slough, Loxahatchee River, Water Catchment Area, or the North County wellfields; 4) water in the sub-basins shall be staged or flows otherwise modified to maximize the retention capabilities of the site; and 5) post-development runoff volumes shall not exceed pre-development runoff volumes for a storm event of three-day duration and a 25-year return frequency. All discharges from the surface water management system shall meet the water quality standards of Florida Administrative Code Rule 17-3. Prior to commencing physical development, the drainage plan shall be reviewed by Palm Beach County Environmental Resource Management Department and approved by the Treasure Coast Regional Planning Council and the South Florida Water Management District in consultation with the Loxahatchee River Management Coordinating Council and the North Palm Beach County Water Control District. A sufficient conceptual water management permit application showing the above information shall serve as the plan to be submitted. The cost of plan review to Treasure Coast Regional Planning Council shall be paid by the developer within 30 days of submission of evidence to the developer by Treasure Coast Regional Planning Council supporting the costs of review.

19. The developer shall design and construct the surface water management system so that maintenance of normal hydroperiods within improved and preserved wetlands can be guaranteed against the negative impacts of activities within the project boundaries, and so that the functions and values provided by these habitats will be maintained. Under no circumstances shall unfiltered runoff from large impervious surfaces and parking areas be diverted directly into wetlands on site. A plan or plans establishing wetland control elevations shall be submitted to Palm Beach County Environmental Resource Management Department for its review and to South Florida Water Management District and the Treasure Coast Regional Planning Council for approval. The plan(s) shall demonstrate how sufficient quantities of surface runoff from portions of the developed areas will be conveyed to wetland areas in order to maintain or improve their existing hydroperiod. The plan(s) shall be approved by Treasure Coast Regional Planning Council prior to submittal of construction permit applications to the South Florida Water Management District. A sufficient conceptual water management permit application showing the above information shall serve as the plan to be submitted. The cost of plan review to Treasure Coast Regional Planning Council shall be paid by the developer within 30 days of submission of evidence to the developer by

Treasure Coast Regional Planning Council supporting the costs of review.

20. Maintenance and management efforts required to assure the continued viability of preserved wetland habitats and the proper operation of all components of the surface water management system shall be the financial and physical responsibility of the developer. Any entities subsequently approved by Palm Beach County to replace the developer shall be required, at a minimum, to assume the responsibilities outlined above.

21. By the end of Phase I, a vegetated littoral zone shall be established for the lake(s) constructed on site. Prior to construction of the surface water management system for any phase of the development, the developer shall prepare a design and management plan for the wetland/littoral zone that will be developed as part of that system. The plan shall be subject to review by Palm Beach County Environmental Resource Management Department and approval by South Florida Water Management District and the Treasure Coast Regional Planning Council prior to beginning any excavation activity. Littoral zones shall be constructed concurrent with lake excavation and final grading. Operational permits for that portion of the surface water management system shall not be utilized until such time as littoral zones have been found to be constructed in conformance with approved plans. The cost of plan review to Treasure Coast Regional Planning Council shall be paid by the developer within 30 days of submission of evidence to the developer by Treasure Coast Regional Planning Council supporting the costs of review.

WATER SUPPLY AND WASTEWATER

22. At such time as municipal water service becomes available to the site, the development shall connect to such service.

23. At such time as municipal wastewater service becomes available to the site, the development shall connect to such service and the one existing septic tank system shall be abandoned in accordance with Chapter 10D-6, Florida Administrative Code and Palm Beach County ECR-I.

24. Xeriscape landscaping as defined by the South Florida Water Management District shall be exclusively used on the project. The field areas in between and around the runways shall not be irrigated. The areas may only be temporarily irrigated to establish newly planted, seeded, or sodded areas.

25. All development in North Palm Beach General Aviation Airport shall use water-saving plumbing fixtures and other water conserving devices as specified in the Water Conservation Act, Section 553.14, Florida Statutes, to reduce water use.

HAZARDOUS MATERIALS AND WASTE

26. Before construction plans are approved for any portion of the site, the developer shall provide a hazardous materials management plan which shall be reviewed and approved by Palm Beach County Environmental Resource Management, the Treasure Coast Regional Planning Council, South Florida Water Management District, The Palm Beach County Public Health Unit, and Florida

Department of Environmental Regulation. For the purposes of this plan, hazardous materials are those constituents found in reportable quantities on site identified pursuant to 42 USC, Section 6921 (RCRA); 42 USC, Section 9602 (CERCLA); 42 USC, Section 11011 et. seq. (SARA Title III); and Part IV, Chapter 403, Florida Statutes. At a minimum, the plan shall:

A. require disclosure by all owners or tenants of the property of all hazardous materials or waste proposed to be stored, used, or generated on premises;

B. require the inspection of all premises storing, using, or generating hazardous materials or waste prior to commencement of operation, and periodically thereafter, to assure that proper facilities and procedures are in place to properly manage hazardous materials projected to occur;

C. provide minimum standards and procedures for storage, prevention of spills, containment of spills, and transfer and disposal of such materials or waste;

D. provide for proper maintenance, operation, and monitoring of hazardous materials and waste management systems including spill and hazardous materials and waste containment systems;

E. detail actions and procedures to be followed in case of spills or other accidents involving hazardous materials or waste;

F. guarantee financial and physical responsibility for spill clean-up; and

G. include a program for continued monitoring of surface and groundwater on the site.

The approved plan shall be incorporated into the development by including it as part of any lease or sale agreement provided to tenants and owners that will use, handle, store, display, or generate hazardous materials or waste. The cost of plan review to Treasure Coast Regional Planning Council shall be paid by the developer within 30 days of submission of evidence to the developer by Treasure Coast Regional Planning Council supporting the costs of review.

27. All site plans and layouts for the North Palm Beach County Airport shall be in accordance with the requirements of the Palm Beach County wellfield protection ordinance. All plan approvals shall note specifically what development will be allowed in areas within the zone of influence of any existing or proposed on-site well or municipal wellfield in the area.

28. The fuel farm shall be constructed to comply with Chapter 17-61, Florida Administrative Code. In addition, the following design criteria shall be met:

A. fuel shall be stored in above-ground, horizontal tanks on elevated cradles to allow for ease of inspection and maintenance;

B. the fuel spill containment area shall be constructed of reinforced concrete and shall be

capable of containing 200 percent of the fuel storage capacity of the largest tank; and

C. the containment area shall have its drainage system segregated from the main airport system and shall include fuel/water separators and a pump out system so that stormwater can be discharged from the containment area relatively free from spilled fuel.

The above criteria shall be provided for in all permit applications and permits for construction and operation of the fuel farm provided the conditions are acceptable to the Florida Department of Environmental Regulation.

29. All drainage and stormwater runoff systems serving the runways, taxiways, aprons, airplane washdown areas, and other paved areas shall be designed and constructed in such a manner as to prevent soil, surface water, and groundwater contamination through the use of pollution retardant basins, oil/grease traps, and other means to segregate and collect pollutants.

30. Prior to commencing construction of the fuel farm, the developer shall install a system of surface and groundwater monitoring stations and maintain an ongoing water quality monitoring program. The locations of sampling stations and monitoring wells, as well as a sampling and testing schedule, shall be developed in conjunction with and reviewed by Palm Beach County Environmental Resource Management Department and approved by the Treasure Coast Regional Planning Council, the South Florida Water Management District, and the Florida Department of Environmental Regulation and shall include monitoring at the point of surface water discharge from the site.

31. Disposal of hazardous materials or wastes into the sanitary sewer system shall be prohibited. For the purposes of this paragraph, hazardous materials are those constituents identified pursuant to 42 USC, Section 6921 (RCRA); 42 USC, Section 9602 (CERCLA); 42 USC, Section 11011 et. seq. (SARA Title III); and Part IV, Chapter 403, Florida Statutes.

SOLID WASTE

32. As a part of any site plan application for any portion of the project, a commitment shall be obtained from the Solid Waste Authority of Palm Beach County to provide solid waste disposal service to that portion of the project.

33. As part of any site plan application for any portion of the project, the developer shall submit a solid waste stream reduction/recycling plan approvable by the Solid Waste Authority of Palm Beach County.

ENERGY

34. In the final site and building design plans, the developer and each subsidiary developer shall: 1) incorporate those energy conservation measures identified on pages 25-4 and 25-6 of the North Palm Beach County General Aviation Airport Application for Development Approval; 2) comply with the Florida Thermal Efficiency Code Part VII, Chapter 553, Florida Statutes; and 3) to the maximum extent feasible, incorporate measures identified in the Treasure Coast Regional Planning Council's Regional Energy Plan.

35. The developer shall incorporate each of the 16 energy saving methods outlined in the ENERGY section discussion of the Treasure Coast Regional Planning Council's Assessment Report for the North Palm Beach County General Aviation Airport unless it can be demonstrated to the satisfaction of Palm Beach County that individually each method is not cost effective.

TRANSPORTATION

36. No building permits for Phase I shall be issued for the North Palm Beach County General Aviation Airport Development of Regional Impact until an irrevocable letter of commitment from the Palm Beach County Department of Airports has been provided committing to dedicate a 200-foot right-of-way along the proposed SR 7 to Palm Beach County free and clear of all liens and encumbrances and consistent with the Palm Beach County Thoroughfare Right-of-way Protection Plan.

37. No building permits for Phase I of the North Palm Beach County General Aviation Airport Development of Regional Impact shall be issued until contracts have been let for construction of the following intersection improvements at the proposed site entrance and Beeline Highway:

North approach	-	right-turn lane
South approach	-	left-turn lane
West approach	-	left-turn lane
	-	right-turn lane

No certificates of occupancy shall be issued and no fixed based aircraft shall be permitted to occupy the airport until the above improvements have been completed.

38. Palm Beach County Department of Airports shall monitor traffic conditions on an annual basis on the following roadway segments and at the following intersections starting with commencement of Phase II through completion of Phase III:

Road Segments

A. Beeline Highway from the project site entrance to PGA Boulevard;

B. PGA Boulevard from Beeline Highway to west of Florida's Turnpike (PGA entrance);

C. PGA Boulevard from west of Florida's Turnpike (PGA entrance) to Florida's Turnpike; and

D. Northlake Boulevard from Beeline Highway to Military Trail.

Intersections

A. PGA Boulevard/Beeline Highway;

B. PGA Boulevard/Florida's Turnpike;

C. Northlake Boulevard/Beeline Highway; and

D. Northlake Boulevard/Military Trail.

Prior to commencing Phase II construction, traffic monitoring methodology shall be approved by the Treasure Coast Regional Planning Council in

consultation with the City of Palm Beach Gardens, and the Florida Department of Transportation. A monitoring report utilizing the approved methodology shall be submitted by December 31 of each year and shall be approved by the Treasure Coast Regional Planning Council in consultation with the above mentioned agencies. If this report indicates that the road segment(s) and/or intersection(s) has exceeded Council's objective level of service standard during the year, and that project traffic meets or exceeds the regional threshold, then no further building permits shall be issued until contracts have been let for roadway improvements required to eliminate over capacity conditions on the roadway segment(s) and/or intersections(s). No certificates of occupancy or increase in the number of fixed base aircraft shall be granted until the subject roadway improvements have been completed. The costs of monitoring methodology and monitoring report review to Treasure Coast Regional Planning Council shall be paid by the developer within 30 days of submission of evidence to the developer by Treasure Coast Regional Planning Council supporting the costs of review.

39. The developer shall pay a fair share contribution consistent with a fair share impact fee ordinance applicable to the North Palm Beach County General Aviation Airport Development of Regional Impact.

40. No additional building permits or increases in fixed base aircraft shall be granted after December 31, 2005, unless a traffic study has been conducted by the developer, and submitted to and approved by Treasure Coast Regional Planning Council in consultation with Palm Beach County, City of Palm Beach Gardens, and Florida Department of Transportation that demonstrates that the regional roadway network can accommodate a specified amount of additional North Palm Beach County General Aviation Airport general traffic and growth in background traffic beyond 2005 and still be maintained at Level of Service C during average annual daily conditions and Level of Service D during peak season, peak hour conditions. The traffic study shall:

    A. be conducted in 2005; and

    B. identify the improvements and timing of those improvements necessary to provide Level of Service C under average annual daily traffic conditions and Level of Service D under peak season, peak hour operating conditions for the subject transportation network during the projected completion of the project, including project impacts and growth in background traffic.

    Additional building permits or increases in fixed base aircraft shall not be granted until a new project phasing program and roadway improvement program (necessary to maintain Level of Service C average annual and Level of Service D peak season, peak hour operating conditions) has been approved by Treasure Coast Regional Planning Council in consultation with Palm Beach County, City of Palm Beach Gardens, and Florida Department of Transportation for the remainder of the development. The cost of plan review to Treasure Coast Regional Planning Council shall be paid by the developer within 30 days of submission of evidence to the developer by Treasure Coast Regional Planning Council supporting the costs of review.

41. Except for utilities necessary to serve the approved airport development, development occurring outside the airfield fence, and beyond what is described on the legend of the Master Development Plan (Map H-R) dated October 16, 1989, and in Table 12.1, Airport Facilities Summary, dated November 11, 1988, of the North Palm Beach County General Aviation Airport Application for Development Approval shall be reviewed as a substantial deviation under Section 380.06(19)(g), Florida Statutes.

LAND USE COMPATIBILITY

42. Restrictions contained in Exhibit LUC-2 of the Treasure Coast Regional Planning Council Assessment Report for the North Palm Beach County General Aviation Airport Development of Regional Impact, a copy of which is attached hereto as Exhibit "B", are hereby incorporated by reference as though fully set forth herein. Such restrictions shall be incorporated in requirements and lease agreements with any tenants and fixed based operators on the site. For clarification, Restriction #1 should be modified to indicate that the Crosswind Runway (13-31) has a 12,500 pound limitation. Any further changes to these restrictions shall constitute a substantial deviation and shall be subject to further review under Section 380.06(19)(g), Florida Statutes.

43. The interlocal agreement between the City of Palm Beach Gardens and Palm Beach County contained in Appendix C of the Treasure Coast Regional Planning Council Assessment Report for the North Palm Beach County General Aviation Airport Development of Regional Impact, a copy of which is attached hereto as Exhibit "C", is hereby incorporated as part of this Development Order for the North Palm Beach County General Aviation Airport Development of Regional Impact. Any changes to this agreement shall constitute a substantial deviation and shall be subject to further review under Section 380.06(19)(g), Florida Statutes.

44. All lands inside the projected 65 Ldn contour area as shown on Exhibit LUC-1 of the Treasure Coast Regional Planning Council Assessment Report for the North Palm Beach County General Aviation Airport Development of Regional Impact shall continue to carry land use designations which are compatible with the use of the airport facility as proposed, and consistent with natural resource and other features of such property. Land use compatibility may be further enhanced within the projected 65 Ldn contour designated RR-10 by consideration of:

    A. Use of TDR's;

    B. Cluster housing techniques;

    C. Required dedication of avigation easements;

    D. Noise attenuating construction and design standards;

    E. Comprehensive plan amendment; or

    F. Other appropriate actions as the county may determine

within one year after adoption of this development order.

LOCAL CONDITIONS

POLICE AND PUBLIC SAFETY

45. No certificates of occupancy should be issued for any parcel of the North Palm Beach County General Aviation Airport until adequate assurance of security or police protection by the Palm Beach County Sheriff's Department or other applicable local service provider is confirmed guaranteeing that there is sufficient manpower and equipment to provide safe and adequate protection to the development in that parcel.

46. Prior to the approval of any site plans for North Palm Beach County General Aviation Airport, the developer should consult with the Palm Beach County Sheriff's Department or the applicable local service provider to ensure that all development plans enhance the ability of the Department to provide for public safety through consideration of lighting and building layout, and other features which will ensure the safety and security of the project.

FIRE PROTECTION, WATER AND WASTEWATER

47. No certificates of occupancy should be issued for any parcel of the North Palm Beach County General Aviation Airport until adequate assurance of fire protection by the Palm Beach County Fire Department or other applicable local service provider is confirmed guaranteeing that there is sufficient manpower and equipment to provide safe and adequate protection to the development in that parcel.

48. Prior to the approval of any site plans for the North Palm Beach County General Aviation Airport, the developer shall consult with the Palm Beach County Fire Department or the applicable local service provider to ensure that all development plans enhance the ability of the Department to provide for public safety through consideration of adequate access to all parts of the project site, consideration of lighting and building layout, consideration of fire hydrant location and spacing, and other features which will ensure the safety and security of the project.

49. The developer shall provide an optimally located site for a crash, fire, rescue (CFR) station, and shall suitably equip and man it as indicated on page R-30-1 of the Application for Development Approval, for the North Palm Beach County General Aviation Airport.

50. The application and engineering plans, calculations, etc. to construct well and/or septic tank must me submitted to the Health Department prior to site plan approval (or prior to issuance of Building Permit for straight rezoning).

51. This approval is limited to construction of the Administration Building for office use only. Any further use requires the project to be connected to public water and sewer or receipt of a septic tank variance from the Department of Health and Rehabilitative Services or a special exception from Palm Beach County for a package plant if flow exceeds 5,000 g.p.d. Facilities not requiring sewer such as runways, tie down facilities and T-hangers may be constructed but not operated prior to issuance of any variance or special exception required.

SITE DEVELOPMENT

52. A 25 foot wide landscape buffer shall be maintained along Bee Line Highway. This buffer shall be landscaped to include:

    A. A double row of native canopy trees planted 20 feet on center.

    B. A 36 inch continuous native understory planting.

    C. No additional landscape treatment will be required within preserve areas.

    D. Landscape plans shall be subject to Department of Airports' review.

    E. Existing vegetation may be credited toward this condition.

53. Individual building site plans shall be approved by Site Plan Review Committee prior to site development. These plans shall conform to County Codes in effect at the time of development and conditions of approval.

54. All buildings shall maintain a 60 foot setback from property lines.

55. As provided in the Palm Beach County Zoning Code, Sections 400.2 and 402.6, failure to comply with any of these conditions of approval at any time may result in:

    A. The denial or revocation of a building permit; the issuance of a stop work order; the denial of a Certificate of Occupancy on any building or structure; or the denial or revocation of any permit or approval for any developer-owner, commercial-owner, lessee, or user of the subject property; and/or

    B. the revocation of the Special Exception and any zoning which was approved concurrently with the Special Exception as well as any previously granted certifications of concurrency or exemptions therefrom; and/or

    C. A requirement of the development to conform with updated standards of the development, applicable at the time of the finding of non-compliance, or the addition or modification of conditions reasonably related to the failure to comply with existing conditions.

    Appeals of any departmental-administrative actions hereunder may be taken to the Palm Beach County Board of Adjustment or as otherwise provided in the Palm Beach County Zoning Code. Appeals of any revocation of Special Exception, Rezoning, or other actions based on a Board of County Commission decision, shall be by petition for writ of certiorari to the Fifteenth Judicial Circuit.

Operational Conditions

56. Constructed in accordance with the FAA standards, the southern east-west runway will be limited to 4,300 feet in length with a maximum 12,500 pound limitation. The northern east-west runway will be limited to 3,700 feet in length. The crosswind runway will be limited to 4,300 feet in length.

57. In accordance with the FAA airspace determination, runway alignment for the east-west runways will be 08-26. Runway alignment for the crosswind runway will be 13-31.

58. The Palm Beach County Department of Airports, in their proprietary capacity of operating the North County Airport, will restrict flight training activities to non-populated areas by including in its leases with each resident fixed base operator who conducts flight training a requirement that flight training procedures will be designed to keep the flight training activities away from the populated portions of Palm Beach Gardens and other residential communities.

59. Aircraft allowed to use the airport will be those specifically identified in FAA Advisory Circular 36-3E that comply with the FAA computer model determinations using a 65 dba noise level upon designated monitoring sites in the residential area existing as of February 1988 in the City of Palm Beach Gardens and other residential communities, including P.G.A. National Resort Community, while using noise abatement flight tracks and noise abatement profiles developed, implemented, monitored and enforced by Palm Beach County.

60. Nighttime Operations - Nighttime operational procedures shall be in effect between 10:00 p.m. and 6:00 a.m. During those hours the northwest-southeast runway will be the preferred runway utilized, except when conditions do not allow a northwest-southeast operation. In such an event, westerly departures will be the preferred runway utilized unless windy conditions are prohibitive; and, in that event only easterly departures may be conducted by aircraft identified in Condition No. 59 above.

61. Remote noise monitoring stations will be installed by the County at the northwest corner and southwest corner of P.G.A. National Resort Community and at the western edge of Eastpoint. These stations will be installed, maintained and operated by Palm Beach County with adequate reporting of noise levels.

62. Aircraft noise emission levels will not exceed 65 dba maximum within the present residential areas of the City of Palm Beach Gardens and other residential communities as determined and identified in Condition No. 59 above.

63. Instrument Landing System (ILS), if installed, will pertain to landings from the west only.

64. Palm Beach County will prohibit all regularly scheduled commercial aircarrier passenger flights.

65. A fine system for aircraft using the airport in violation of these conditions of Palm Beach County Department of Airports shall be as follows:

First Offense:	Warning.
Second Offense:	$100 for each such second offense and $100 for each decibel over that determined under Condition No. 59 above.
Third Offense:	Suspend Use of airport facilities.

66. Palm Beach County and the community of Palm Beach Gardens will act to keep those areas between the P.G.A. National Resort Community and the proposed aviation facility in a land use category compatible with aircraft operations.

67. An airport manager will be employed to assist in enforcement of restrictions.

SECTION 4: The requirements in Conditions 45 through 55 are local in nature. Therefore, any changes to these conditions authorized by the County shall not constitute substantial deviations and shall not be subject to the substantial deviation provisions of Section 380.06(19), Florida Statutes. Any modifications or deviations from the other requirements of this Development Order shall be submitted to the County's Planning, Zoning and Building Administrator for a determination by the Board of County Commissioners of the County of Palm Beach as to whether the change constitutes a substantial deviation as provided in Section 380.06(19), Florida Statutes, and such modification shall be processed pursuant to Section 380.06, Florida Statutes, as the same may be amended from time to time.

SECTION 5: Compliance with the Development Order shall be monitored through normal County permitting procedures, the procedures in specific conditions of approval, and review of the annual report. The local official responsible for assuring compliance with this Development Order is the Planning, Zoning, and Building Administrator for Palm Beach County.

SECTION 6: The annual report required by Section 380.06(19), Florida Statutes, shall be submitted each year within ten (10) days of the anniversary date of the effective date of this Development Order. The annual report shall be submitted to Palm Beach County, the Treasure Coast Regional Planning Council, the Department of Community Affairs, the City of Palm Beach Gardens, the State of Florida Department

of Environmental Regulation and the South Florida Water Management District. This annual report shall include the following items:

1. Any changes in the plan of development, or in the representations contained in the Application for Development Approval, or in the phasing for the reporting year and for the next year.

2. A summary comparison of development activity proposed and actually conducted for the year.

3. Undeveloped tracts of land that have been sold to a separate entity or developer.

4. Identification and intended use of any lands purchased, leased or optioned by the developer adjacent to the original DRI site since the Development Order was issues.

5. An assessment of the developer's and the local government's compliance with the conditions of approval contained in this DRI Development Order and the commitments which are contained in the Application for Development Approval and which have been identified by Palm Beach County, the Treasure Coast Regional Planning Council or the Department of Community Affairs as being significant.

6. Any request for substantial deviation determination that was filed in the reporting year or is anticipated to be filed during the next year.

7. An indication of a change, if any, in local government jurisdiction for any portion of the development since the Development Order was issued.

8. A list of significant local, state and federal permits which have been obtained or which are pending by agency, type of permit, permit number and purpose of each.

9. A statement that all persons have been sent copies of the annual report in conformance with subsections 380.06(15) and (18), Florida Statutes.

10. A copy of any recorded notice of the adoption of a Development Order or the subsequent modification of an adopted Development Order that was recorded by the developer pursuant to subsection 380.06(15)(f), Florida Statutes, during the reporting year.

SECTION 7: Compliance dates for commencing development and complying with conditions of approval are listed in the conditions of approval. This Development Order shall terminate twenty years after the effective date of this Development Order.

SECTION 8: Palm Beach County hereby agrees that the North Palm Beach County General Aviation Airport Development of Regional Impact shall not be subject to downzoning or intensity reduction for a period of twenty years from the effective date of this Development Order, unless Palm Beach County can demonstrate that substantial changes in the conditions underlying the approval of the Development Order have occurred or that the Development Order was based on substantially inaccurate information provided by the developer, or that the change is clearly established by Palm Beach County to be essential to the public health, safety, or welfare.

SECTION 9: The definitions found in Chapter 380, Florida Statutes, shall apply to this Development Order. It is understood that any reference herein to any governmental agency shall be construed to mean any future instrumentality which may be created or designated as successor in interest to, or which otherwise possesses any of the powers and duties of, any referenced government agency in existence on the effective date of this Development Order.

SECTION 10: The approval granted by this Development Order is conditional and shall not be construed to obviate the duty of the developer to comply with all other applicable local, state, and federal permitting requirements.

SECTION 11: Certified copies of this Development order shall be transmitted by certified mail to the State of Florida Department of Community Affairs, the Treasure Coast Regional Planning Council and the Developer. A Notice of Adoption of this Development Order shall be filed and recorded in the public records of Palm Beach County, Florida, by the developer, within ten (10) days after adoption.

SECTION 12: This Development Order shall not be construed as a waiver of any Municipal, County, or State requirements for other necessary permits, building permits, certificates of occupancy, or similar matters provided for by statue, rule, or ordinance, unless said requirements are specifically waived in this Order.

SECTION 13: This Development Order shall be binding upon and inure to the benefit of the developer and its assigns or successors in interest and the present owners and their assigns or successors in interest. It is understood that any reference herein to any governmental agency shall be construed to also include any future instrumentality which may be created and designated as successor in interest to, or which otherwise possesses any of the powers and duties or, any referenced governmental agency in existence on the effective date of this Development Order.

SECTION 14: In the event that any portion or section of this Development Order is determined to be invalid, illegal or unconstitutional by a court of competent jurisdiction, such decision shall in no manner affect the remaining portions or section of the Development Order which shall remain in full force and effect.

SECTION 15: This Development Order shall become effective immediately upon adoption.

Commissioner Marcus moved for approval of the Resolution. The motion was seconded by Commissioner

Howard and, upon being put to a vote, the vote was as follows:

Carol J. Elmquist, Chair	_	AYE
Ron Howard	_	AYE
Karen T. Marcus	_	AYE
Carole Phillips	_	ABSENT
Carol Roberts	_	ABSENT

The Chair thereupon declared the Resolution was duly passed and adopted this 22nd day of February, 1990.

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY

BY: _____
County Attorney

PALM BEACH COUNTY, FLORIDA
BY ITS BOARD OF
COUNTY COMMISSIONERS

JOHN B. DUNKLE, CLERK

BY: _____
Deputy Clerk

DESCRIPTION

All that portion of the Northwest One-Quarter (NW 1/4) of Section 1, Township 42 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

TOGETHER WITH all that portion of the Southwest One-Quarter (SW 1/4) of Section 1, Township 42 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

TOGETHER WITH all that portion of the Southeast One-Quarter (SE 14) of Section 1, Township 42 South, Range 41, East, lying Southwesterly of the South westerly right-of-way line of the Seaboard Airline Railroad

TOGETHER WITH all that portion of Section 2, Township 42 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

TOGETHER WITH all of Section 3, Township 42 South, Range 41 East;

TOGETHER WITH all that portion of the Northeast One-Quarter (NE 1/4) of Section 11, Township 42 South, Range 41 East, being more particularly described as follows:

COMMENCE at the Northeast corner of the said Northeast One-Quarter (NE 1/4);

THENCE on a grid bearing of N 89° 35′ 37″ W along the North line of the said Northeast One-Quarter (NE 1/4) a distance of 500.00 feet to the POINT OF BEGINNING;

THENCE S 45° 24′ 23″ W a distance of 1350.00 feet;

THENCE N 44° 35′ 37″ a distance of 1350.00 feet to a point on the North line of the said Northeast One Quarter (NE 1/4);

THENCE S 89° 35′ 37″ E along said North line a distance of 1909.19 feet to the POINT OF BEGINNING;

TOGETHER WITH all that portion of Section 34, Township 41 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

TOGETHER WITH all that portion of the Southwest One-Quarter (SW 1/4) of Section 35, Township 41 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

Said land situate within Palm Beach County, Florida, containing 1832.31 Acres, more or less.

EXHIBIT A

EXHIBIT LUC-2: AIRPORT USE RESTRICTIONS

NORTH COUNTY GENERAL AVIATION FACILITY USE RESTRICTIONS

1. CONSTRUCTED IN ACCORDANCE WITH THE FAA STANDARDS, THE SOUTHERN EAST-WEST RUNWAY WILL BE LIMITED TO 4,300 FEET IN LENGTH WITH A MAXIMUM 12,500 POUND LIMITATION. THE NORTHERN EAST-WEST RUNWAY WILL BE LIMITED TO 3,700 FEET IN LENGTH. THE CROSSWIND RUNWAY WILL BE LIMITED TO 4,300 FEET IN LENGTH.

2. IN ACCORDANCE WITH THE FAA AIRSPACE DETERMINATION, RUNWAY ALIGNMENT FOR THE EAST-WEST RUNWAYS WILL BE 08-26. RUNWAY ALIGNMENT FOR THE CROSSWIND RUNWAY WILL BE 13-31.

3. THE PALM BEACH COUNTY DEPARTMENT OF AIRPORTS, IN THEIR PROPRIETARY CAPACITY OF OPERATING THE NORTH COUNTY AIRPORT, WILL RESTRICT FLIGHT TRAINING ACTIVITIES TO NON-POPULATED AREAS BY INCLUDING IN ITS LEASES WITH EACH RESIDENT FIXED BASE OPERATOR WHO CONDUCTS FLIGHT TRAINING A REQUIREMENT THAT FLIGHT TRAINING PROCEDURES WILL BE DESIGNED TO KEEP THE FLIGHT TRAINING ACTIVITIES AWAY FROM THE POPULATED PORTIONS OF PALM BEACH GARDENS.

4. AIRCRAFT ALLOWED TO USE THE AIRPORT WILL BE THOSE SPECIFICALLY IDENTIFIED IN FAA ADVISORY CIRCULAR 36-3E THAT COMPLY WITH THE FAA COMPUTER MODEL DETERMINATIONS USING A 65 dba NOISE LEVEL UPON DESIGNATED MONITORING SITES IN THE RESIDENTIAL AREA EXISTING AS OF FEBRUARY 1988 IN THE CITY OF PALM BEACH GARDENS AND OTHER RESIDENTIAL COMMUNITIES, INCLUDING P.G.A. NATIONAL RESORT COMMUNITY, WHILE USING NOISE ABATEMENT FLIGHT TRACKS AND NOISE ABATEMENT PROFILES DEVELOPED, IMPLEMENTED, MONITORED AND ENFORCED BY PALM BEACH COUNTY.

5. NIGHTTIME OPERATIONS - NIGHTTIME OPERATIONAL PROCEDURES SHALL BE IN EFFECT BETWEEN 10:00 P.M. AND 6:00 A.M. DURING THOSE HOURS THE NORTHWEST-SOUTHEAST RUNWAY WILL BE THE PREFERRED RUNWAY UTILIZED, EXCEPT WHEN CONDITIONS DO NOT ALLOW A NORTHWEST-SOUTHEAST OPERATION. IN SUCH AN EVENT, WESTERLY DEPARTURES WILL BE THE PREFERRED RUNWAY UTILIZED UNLESS WIND CONDITIONS ARE PROHIBITIVE; AND, IN THAT EVENT ONLY EASTERLY DEPARTURES MAY BE CONDUCTED BY AIRCRAFT IDENTIFIED IN RULE NO. 4 ABOVE.

6. REMOTE NOISE MONITORING STATIONS WILL BE INSTALLED BY THE COUNTY AT THE NORTHWEST CORNER AND SOUTHWEST CORNER OF P.G.A. NATIONAL RESORT COMMUNITY AND AT THE WESTERN EDGE OF EASTPOINT. THESE STATIONS WILL BE INSTALLED, MAINTAINED AND OPERATED BY PALM BEACH COUNTY WITH ADEQUATE REPORTING OF NOISE LEVELS.

7. AIRCRAFT NOISE EMISSION LEVEL OF AIRCRAFT USING THE AIRPORT WILL NOT EXCEED 65 dba MAXIMUM WITHIN THE PRESENT RESIDENTIAL AREAS OF THE CITY OF PAL BEACH GARDENS AS DETERMINED AND IDENTIFIED IN RULE NO. 4 ABOVE.

8. INSTRUMENT LANDING SYSTEM (ILS), IF INSTALLED, WILL PERTAIN TO LANDINGS FROM THE WEST ONLY.

9. PALM BEACH COUNTY WILL PROHIBIT ALL REGULARLY SCHEDULED COMMERCIAL AIR CARRIER PASSENGER FLIGHTS.

10. A FINE SYSTEM FOR AIRCRAFT USING THE AIRPORT IN VIOLATION OF THESE RULES OF PALM BEACH COUNTY DEPARTMENT OF AIRPORTS SHALL BE AS FOLLOWS:

FIRST OFFENSE:	WARNING
SECOND OFFENSE:	$100 FOR EACH SUCH SECOND OFFENSE AND $100.00 FOR EACH DECIBEL OVER THAT DETERMINED UNDER RULE NO. 4 ABOVE.
THIRD OFFENSE:	SUSPEND USE OF AIRPORT FACILITIES

11. PALM BEACH COUNTY AND THE COMMUNITY OF PALM BEACH GARDENS WILL ACT TO KEEP THOSE AREAS BETWEEN THE P.G.A. NATIONAL RESORT COMMUNITY AND THE PROPOSED AVIATION FACILITY IN A LAND USE CATEGORY COMPATIBLE WITH AIRCRAFT OPERATIONS.

12. AN AIRPORT MANAGER WILL BE EMPLOYED TO ASSIST IN ENFORCEMENT OF RESTRICTIONS.

EXHIBIT B

CPS:lw:10/26:PBG .terlocal Agmt

This Interlocal Agreement made and entered into this ___ day of _____, 1988, by and between the City of Palm Beach Gardens, a political subdivision of the State of Florida (hereinafter referred to as the "City") and Palm Beach County, a political subdivision of the State of Florida (hereinafter referred to as "County").

W I T N E S S E T H

WHEREAS, Palm Beach County has determined that it is in the best interest of the public health, safety and welfare that general aviation operations be substantially reduced at its Palm Beach International Airport; and

WHEREAS, Palm Beach County, after many years of thorough research, study and public comment, has determined that it is in the best interest of the public health, safety and welfare to construct and operate a new general aviation airport to be located at the site setforth on Exhibit "A" attached hereto and made a part hereof (hereinafter the "Property"); and

WHEREAS, Palm Beach County and the City of Palm Beach Gardens have worked together to make the aforementioned general aviation airport site as safe and compatible with the interests of the surrounding municipalities as is possible; and

WHEREAS, the County, with input from an advising citizens' group and the City, has developed certain restrictions and guidelines relative to the construction and operation of said Airport for the benefit and general welfare of the public, the City and residents living near the Property and now desire to embody such restrictions in a binding agreement between the parties hereto; and

WHEREAS, Palm Beach Gardens has agreed not to object to nor in any way oppose the County in the DRI and related governmental approval process relative to the development and construction of the aforesaid general aviation facility provided that the aforesaid restrictions and agreement are entered into between the parties; and

WHEREAS, the City and County wish to document their understanding that the County will enforce the restrictions (as hereinafter defined) and that the City and County will otherwise comply with the terms and provisions of this Agreement; and,

EXHIBIT C

WHEREAS, the City and County believe that it is in the public's best interest to enter into this Interlocal Agreement.

NOW THEREFORE, in consideration of the premises and the mutual covenants herein contained, and for such other good and valuable consideration, the receipt of which the parties hereby expressly acknowledge, the parties hereto covenant and agree to the following terms and conditions.

1. Restrictions. The County hereby represents and warrants to City and covenants and agrees that County will implement and enforce the restrictions set forth on Exhibit "B" hereof, (hereinafter referred to as "Restrictions"), relative to the construction, operation, maintenance and use of the airport and all improvements which may be constructed on the Property.

2. Modification. County hereby represents, warrants, covenants and agrees that it shall not in any way modify, amend, eliminate or otherwise reduce or fail to implement or enforce the Restrictions without the prior written consent of City, which consent may be withheld in the sole and absolute discretion of the City. Any written consent shall be in the form of Resolution passed by the City Council. In the event the County proposes any changes to said Restrictions, or enforcement thereof, it shall promptly provide written notice of same to City for City's review and comments, at least ninety (90) days prior to any action being taken by the County Board of County Commissioners. In this regard, any attempt by the County to unilaterally modify, amend, eliminate, or otherwise reduce, or fail to implement or enforce the Restrictions without the prior written concurrence of the City, shall be deemed a breach and violation of this Agreement by the County and shall entitle the City to any and all remedies available to it in law or in equity, including, without limitation, injunctive or other equitable relief to enforce this Agreement.

3. Further Agreements of County. The County agrees to require, at the appropriate time, its staff of the Department of Airports to create and implement rules and regulations which adopt the Restrictions for all persons having business on or relating to the Airport and will incorporate such rules and regulations and the Restrictions into the requirements and lease agreements with any tenants,

fixed base operators or other persons dealing with the County. County further covenants and agrees that the proposed general aviation airport shall be built in accordance with the airport layout plan attached hereto as Exhibit "C" and that no substantial changes thereto shall occur without the mutual consent of the parties hereto.

4. Agreements of City. CITY covenants and agrees that no residential development or other development inconsistent with the proposed airport facility shall be permitted inside the projected 65 Ldn contour area as shown on the map in the Application for Development Approval dated 3/13/89 (hereinafter referred to as the "application"), which is attached hereto as Exhibit "D" and made a part hereof.

5. Further Agreements of City. City hereby represents and warrants to County and covenants and agrees that City shall not institute nor join in any litigation against County nor, in any way, object to, nor, in any way, attempt to prejudicially influence any governmental entities having jurisdiction over the permitting, licensing and operation of this general aviation airport provided that County is not in violation the terms of this Agreement, and, provided further, however, that the operation of said airport by the County is conducted in a safe manner, and that the scope of said operation does not substantially change from the plans as contemplated and publically documented by the County on the effective date hereof including but not limited to the application. Failure of the City to abide by the covenants setforth in this paragraph 5 shall be deemed a breach of this Agreement and shall entitle County in its sole discretion either (1) to assert whatever remedies are available to it in law and/or equity, or (2) to treat this Agreement as null and void and thereafter to proceed as if this Agreement had never been executed. In this regard City acknowledges that County is expressly relying upon the covenants setforth in this paragraph 5 and in paragraph 4 above in its implementation of the restrictions setforth in the attached Exhibit "B".

6. Nothing in this Agreement shall preclude either party from litigating against the other on matters completely unrelated to and not contemplated by this Agreement.

7. This Agreement shall take effect upon execution.

8. The invalidity of any portion, article, paragr provision, clause or any portion thereof of this Agreement shall hav affect upon the validity of any other part or portion hereof.

9. To the extent allowed by law, the venue for any ac arising from this Agreement shall be in Palm Beach County, Flori

10. This Agreement shall be governed by and in accordance the laws of the State of Florida.

11. In any action brought by either party for the enforce of the obligations of the other party, the prevailing party shall entitled to recover reasonable attorney's fees.

12. Any notice given under the provisions of this Agree shall be in writing and shall be delivered personally or sent certified or registered mail, postage prepaid to:

COUNTY:
Palm Beach County
Board of County Commissioners
301 North Olive Avenue
West Palm Beach, Florida 33401

WITH A
COPY TO:
County Attorney
301 North Olive Avenue, Suite 601
West Palm Beach, Florida 33401

CITY:
City of Palm Beach Gardens
City Council
10500 North Military Trail
Palm Beach Gardens, Florida 33410

WITH A
COPY TO:
City Attorney
City of Palm Beach Gardens
10500 North Military Trail
Palm Beach Gardens, Florida 33410

or to such other respective addresses as the parties may designa each other in writing from time to time. Notice by certifi registered mail, return receipt requested, shall be deemed given date that such notice is deposited in a United States Post Office.

13. The parties expressly agree that time is of the esse this Agreement and the failure by a party to complete performance the time specified, or within a reasonable time if no time is sp herein, shall, at the option of the other party without liabil addition to any other rights or remedies, relieve the other party obligation to accept such performance.

14. The headings of the various articles and sections of this Agreement are for convenience and ease of reference only, and shall not be construed to define, limit, augment or describe the scope, context or intent of this Agreement or any part or parts of this Agreement.

15. The parties hereto expressly covenant and agree that in the event either party is in default of its obligations herein, the party not in default shall provide to the party in default thirty (30) days written notice to cure said default before exercising any of its rights as provided for in this Agreement.

16. The parties agree that this Agreement sets forth the entire agreement between the parties, and there are no promises or understandings other than those stated herein. None of the provisions, terms and conditions contained in this Agreement may be added to, modified, superseded or otherwise altered except by written instrument executed by the parties hereto.

(Remainder of page left intentionally blank)

IN WITNESS WHEREOF, the COUNTY has caused this Agreement to be signed by the Chair of the Board of County Commissioners and the seal of said Board to be affixed hereto and attested by the Clerk of said Board, pursuant to the authority granted by said Board, and the City has caused these presents to be signed by its Mayor, acting on behalf of said City Council of Palm Beach Gardens and the seal of said Council to be affixed hereto and attested by the Clerk of said Council, pursuant to the authority granted by said Council, the day and year first written above.

ATTEST:
LINDA V. KOSIER, CITY CLERK

By: Linda V. Kosier

CITY OF PALM BEACH GARDENS

BY: Michael Martino
MAYOR

DATED: 11-7-89

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY

BY: William Brantley
City Attorney

ATTEST:
JOHN B. DUNKLE, Clerk

By: _____
Deputy Clerk

PALM BEACH COUNTY, FLORIDA BY ITS BOARD OF COUNTY COMMISSIONERS

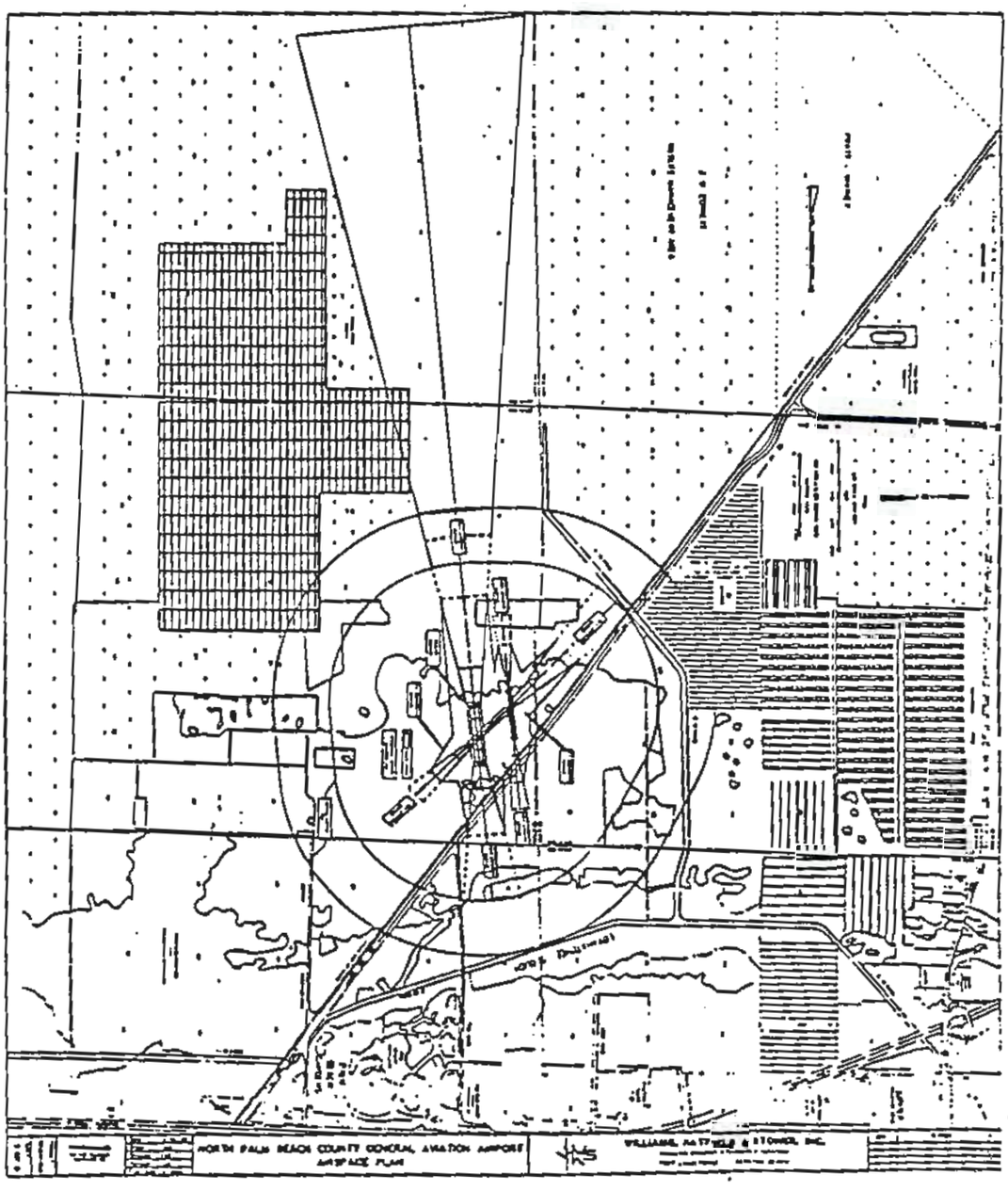
BY: _____
CHAIR

DATED: _____

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY

BY: _____
County Attorney

EXHIBIT "A" - PAGE 1 OF 3 TO
INT. LOCAL AGMT. BETWEEN PBC
AND PEC



Description

All that portion of the Northwest One-Quarter (NW 1/4) of Section 1, Township 42 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

TOGETHER WITH all that portion of the Southwest One-Quarter (SW 1/4) of Section 1, Township 42 South, Range 41 East, lying Southwesterly of the Southwesterly right-of-way line of the Seaboard Airline Railroad;

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THENCE on a grid bearing of N 89°35'37" W along the North line of the said Northeast One-Quarter (NE 1/4) a distance of 500.00 feet to the POINT OF BEGINNING;

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559c/0273P/062988

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Said land situate within Palm Beach County, Florida, containing 1832.31 Acres, more or less.

EXHIBIT "B" TO INTERLOCAL AGR
BET[illegible] PALM BEACH GARDENS AN
PAL[illegible] COUNTY

NORTH COUNTY GENERAL AVIATION FACILITY USE RESTRICTIONS

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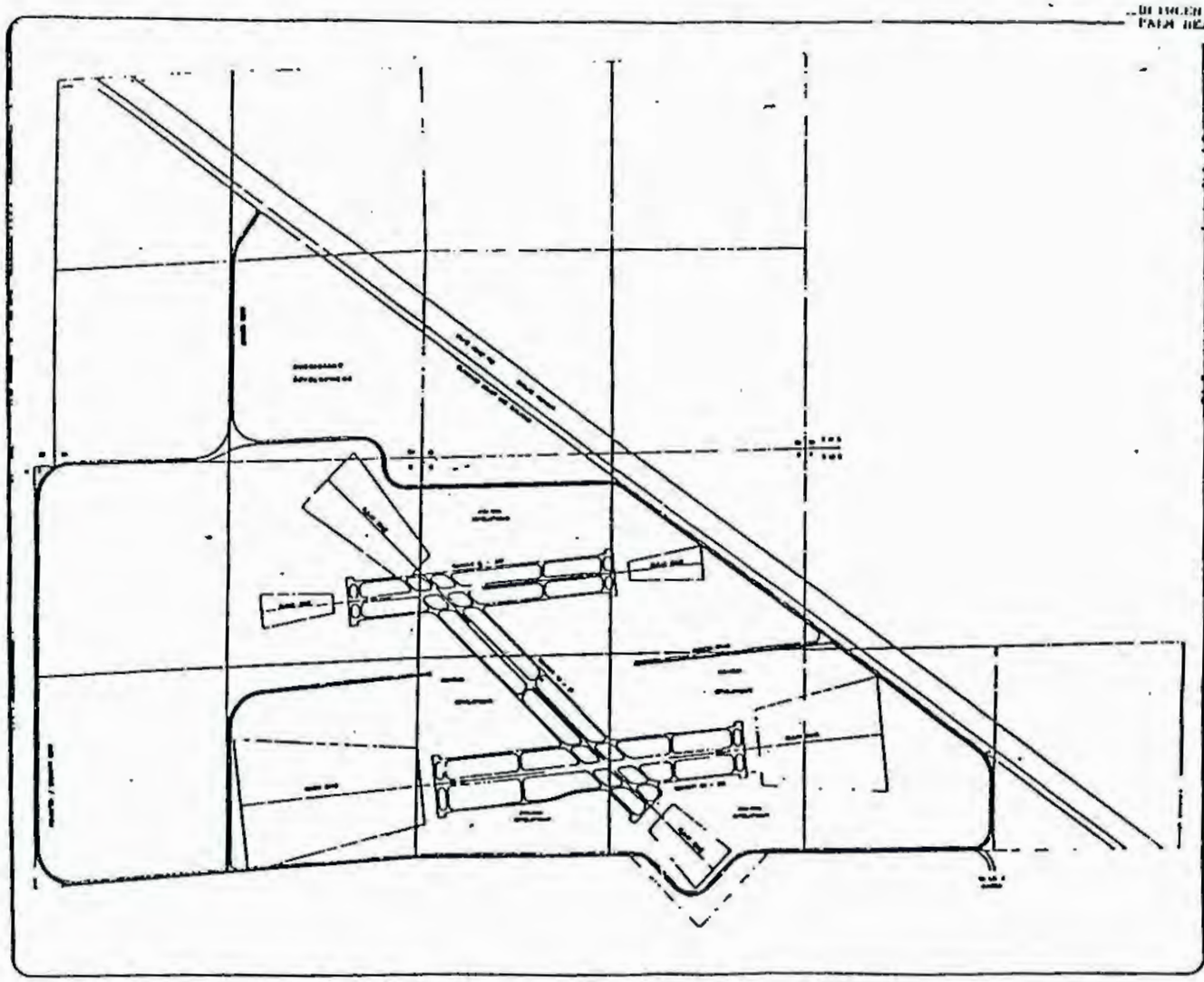
12. AN AIRPORT MANAGER WILL BE EMPLOYED TO ASSIST IN ENFORCEMENT OF RESTRICTIONS.

BETWEEN PALM BEACH GARDENS
PALM BEACH COUNTY



north palm beach county general aviation airport

MASTER DEVELOPMENT PLAN

SCALE 1"=1250'

MAP H