



Chapter 5 Airport Alternatives





CHAPTER FIVE

Airport Alternative Analyses

5.1 General Overview

St. Lucie County International Airport (FPR) is a general aviation airport located within the Treasure Coast Region. The airport which is controlled by a five-member board of elected County Commissioners is situated approximately three miles northwest of the City of Ft. Pierce, twenty-minutes from Port St. Lucie and 60 minutes from West Palm Beach. The airport is sited within the unincorporated portion of St. Lucie County, and is equipped with six runways (10R-28L, 14-32 and 10L-28R). The airport is home to an aircraft rescue and firefighting facility which provides services for both the airport and local community, FAA Air Traffic Control Tower, US Customs and Border Protection, two fixed based operators (APP Jet Center of Ft. Pierce and Key Air Aviation), flight schools, as well as a variety of aviation and non-aviation businesses. As a result the airport supports a variety of operations, including limited air charter¹, flight training, corporate, emergency response and recreational aviation traffic, utilizing a mix of single-engine, twin-engine, turboprop, jet and rotorcraft aircraft.

In 2009, the airport completed its long-term land acquisition program increasing its total acreage to approximately 3,844 acres². This property information was based upon a completed title search and new property acquisition. During the title search and through discussions with airport management, it was determined that property north of North 25th Street which is currently occupied by A&A Salvage was never owned by the Airport or St. Lucie County. As a result, the property line was adjusted to illustrate both the newly acquired property and the correct property line on the east side of the airport property.

¹ Unscheduled air charter operations are associated with aircraft under 30 seats and include inbound traffic from the Caribbean, Bahamas and points throughout the continental United States based upon information obtained from users, airport management and FAA Aviation Flight Plan databases including FBOWeb.com and Enhanced Traffic Management System Counts (ETMSC) data.

² Existing acreage is based upon title search information.



Because of available property, airport management has and continues to market aviation and non-aviation development. Airport property is bordered by four arterial roadways:

- North Kings Highway/Florida State Road 713 to the west
- St. Lucie Blvd to the south
- United States (U.S.) 1 to the east, and
- Indrio Road/Florida State Road 614 to the north.

According to the 2030 Regional Long-Range Transportation Plan (RLRTP) and based upon discussions with St. Lucie County Transportation Planning Organization³, Kings Highway will be widened to six lanes between I-95 and SR-70, and Indrio Road will be widened to four lanes between I-95 and Emerson Avenue. None of these improvements are located within the immediate vicinity of the Airport, and no roadway improvements are planned as shown in **Figure 5-1**. Further, RLRTP is evaluating plans to provide additional access points to Interstate 95 (north-south corridor) and the Florida Turnpike (northwest-southeast corridor).

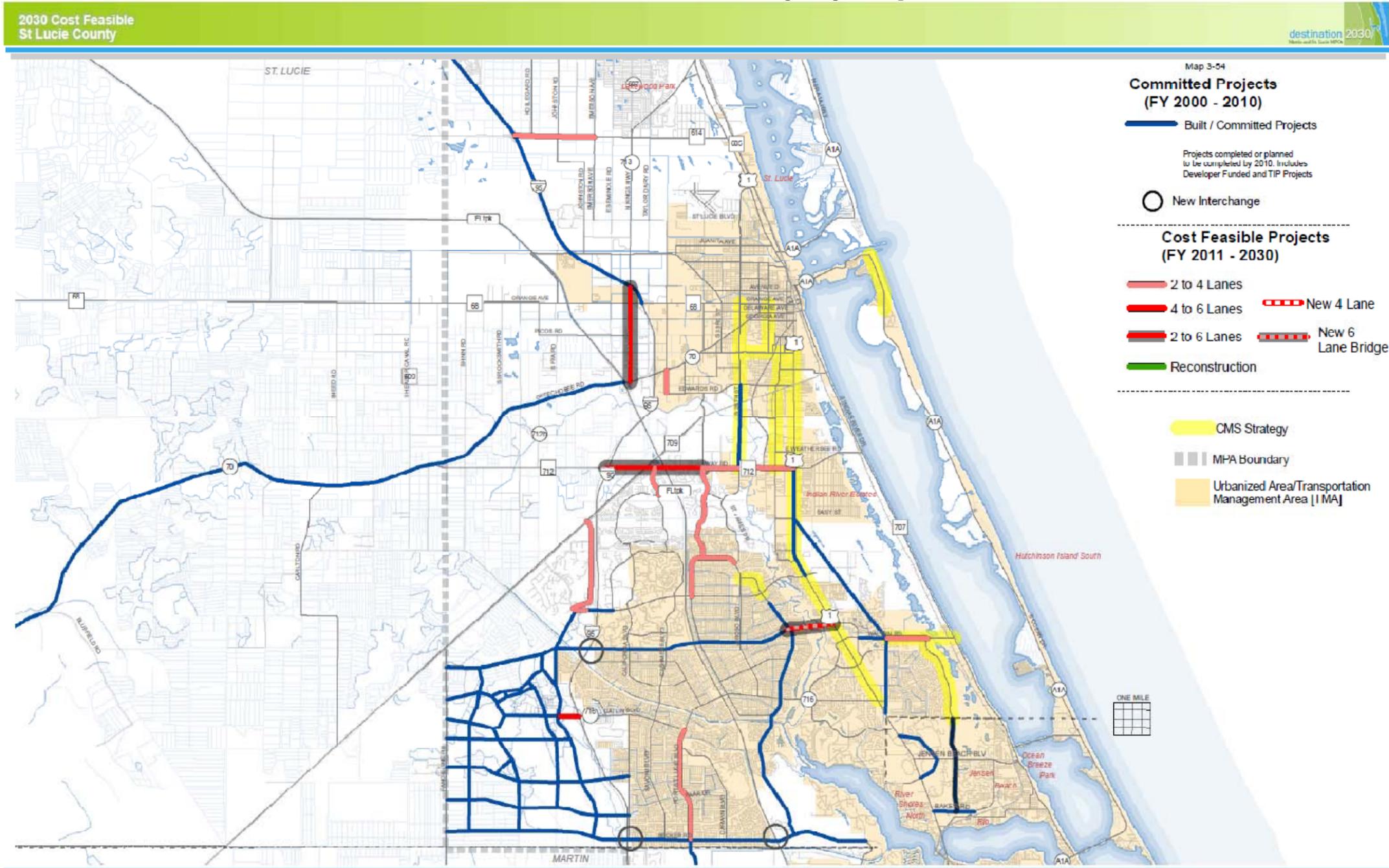
Land use adjacent to FPR includes limited residential, commercial/industrial, mixed use, and conservation zones. Due to the proximity of residential development to the east and south, FPR implemented several voluntary noise mitigation measures based upon the findings of the *2005 FAR Part 150 Noise Study*.

5.1.1 Alternative Analysis Objectives

Although the development of a master plan and associated airport layout plan (ALP) set serves many objectives, one of the most significant purposes of this study is to allow the airport to meet federal assurances for grant funding eligibility. Over the years, the grant legislation has been revised, renamed, and expanded and presently includes 39 separate assurances that must be met in order to be considered “compliant”. The current grant program, referred to as the AIP program, provides grant funding to cover up to 95% of costs required to address airport safety, capacity, security, or environmental concerns. However, funding is a direct result of project priorities, available funding as well as the airport’s position or priority level within the FAA’s National Plan of Integrated Airport System (NPIAS). Grant assurance number 29 states that the airport sponsor will develop and maintain an airport layout plan (ALP) which denotes the airport’s boundaries along with all existing and future development within. The ALP and any revision or modification thereof must be reviewed and approved via signature by an authorized representative of the Secretary.

³ Mr. Peter Buchwald

Figure 5-1
Long-Range Transportation Plans



destination 2030 | Martin and St. Lucie MPOs

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Source: 2030 Regional Long Range Transportation Plan (RLRTP), St. Lucie County Transportation Planning Organization



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Therefore the objective of this analysis was to identify short and long-range development based upon FAA approved aviation forecasts and facility requirements. In an effort to obtain insight into key issues, goals and long-range planning efforts, the following reports were reviewed:

- Master Plan Update, Hoyle, Tanner & Associates, Inc., August 2002
- Master Plan Update, Greiner Incorporated, December 1993
- Part 150 Noise Compatibility Study Update, MEA Group, Inc in association with Harris Miller Miller & Hanson, Inc., February 2005
- St. Lucie County revised Transportation Comprehensive Plan, 2007
- St. Lucie County Evaluation and Appraisal Report, Calvin Giordano & Associates, Inc. October 2008
- 2030 Regional Long-Range Transportation Plan, Martin and St. Lucie Metropolitan Planning Organizations, October 2007
- St. Lucie County Comprehensive Plan, 2004 and revised in 2007, St. Lucie County Zoning Maps, St. Lucie County Transportation Planning Organization, etc.

Further, in an effort to coordinate on and off-airport development and maintain compatible land use, proposed airport land use was coordinated with St. Lucie County Planning and Development Services⁴ to protect for future long-term development. Thus, St. Lucie County land use and zoning categories were used to identify development within and adjacent to the airport property.

Discussions were also held with Mr. Neilish Shaw of Florida Power and Light concerning the current heights of the existing power transmission poles and lines on the west side of the airfield as well as the viability of relocating the power poles to either North King's Highway, as previously recommended, or beyond in an effort to accommodate growth at St. Lucie County International Airport. The current poles range in height from 70 to 75 feet above ground elevation. The lines between the poles range from 65 to 70 feet above ground level. It was determined during our discussion with Mr. Shaw that if relocated the power lines and poles would be limited to a height of no greater than 90 to 100 feet above ground level. Thus, these heights were considered in the development of the long term alternative option scenarios.

In addition to the power lines on the west side of the airfield, power lines to the east of FPR which run adjacent to U.S. 1, which are taller, were also considered when evaluating potential airfield development options. These power lines are not currently designated an impact to air

⁴ Ms. Kara Woods and Ms. Sarah Smith, St. Lucie Planning and Development Services Department



navigation since they do not impact the approach or departure surface from Runway 10R-28L. However, they were evaluated with regard to any airfield improvements due to their location in relation to the airport and associated operating airspace.

An analysis of existing facility requirements based upon FAA approved forecasts⁵, as presented in **Chapter 4**, identified some airside and landside improvements. Commercial service enplanements and operational forecasts were not developed as part of this master plan update. However, at the request of the St. Lucie Board of County Commissioners (BOCC) and Master Plan Technical Advisory Committee (TAC), facilities needed to accommodate the potential for commercial service (including large (greater than 31 seats) air charter operations and regional air carrier operations) within and beyond the twenty-year planning time frame were identified. However, in order to support such a venture, a number of studies and requirements must first be fulfilled including but not limited to updating the Master Plan and ALP to reflect this demand, completing a benefit-cost analysis, various environmental and noise studies as well as improvements to airfield pavement, markings, security fencing and equipment, etc. Finally, the airport must pass an FAA airport inspection prior to initially obtaining a FAR Part 139 operating certification.

“14 CFR Part 139 requires FAA to issue airport operating certificates to airports that---

- Serve scheduled and unscheduled air carrier aircraft with more than 30 seats;
- Serve scheduled air carrier operations in aircraft with more than 9 seats but less than 31 seats; and
- The FAA Administrator requires (the airport) to have a certificate.

This Part does not apply to airports at which air carrier passenger operations are conducted only because the airport has been designated as an alternate airport.

Airport Operating Certificates serve to ensure safety in air transportation. To obtain a certificate, an airport must agree to certain operational and safety standards and provide for such things as firefighting and rescue equipment. These requirements vary depending on the size of the airport and the type of flights available. The regulation, however, does allow FAA to issue certain exemptions to airports that serve few passengers yearly and for which some requirements might create a financial hardship”⁶.

⁵ Forecasts were based upon existing traffic operations including limited air taxi, general aviation and limited military operations.

⁶ Federal Aviation Administration, Part 139 Certification data, What Is Part 139? (http://www.faa.gov/airports/airport_safety/part139_cert/?p1=what)



It is important to note that FAR Part 139 is associated strictly with commercial passenger service. A general aviation airport may support maintenance, refurbishment and limited air cargo operations associated with commercial type aircraft, such as the Canadair Regional Jet or Boeing 737, as long as the airport facilities (i.e. runway length, pavement strength, pavement separation, etc) are available to accommodate the safe operations of these aircraft. Therefore, in identifying potential alternative development scenarios, three levels of service were identified: general aviation only, limited commercial service (i.e. commuter service), and commercial air carrier service. The airport's role in each of these scenarios drives the type and level of development both within and beyond the twenty-year planning period. Since commercial passenger service forecasts were not developed, sizing of specific facilities, including the terminal building, terminal apron, fuel requirements, etc. were estimated using generalized FAA design criteria.

The role of this airport and planned development both within and beyond the planning period was established based upon input from BOCC, TAC, airport users, St. Lucie County Transportation Planning Organization, City of Ft. Pierce Planning and Zoning, Port St. Lucie Planning and Zoning, Federal Aviation Administration (FAA), Florida Department of Transportation (FDOT) and the general public through a variety of media (i.e. website, meetings, workshops, etc.). This information was used to develop the Preferred Scenario which consists of a hybrid of the scenarios presented. Implementation of the selected concept is defined in subsequent chapters.

5.1.2 Key Issues and Facility Requirements

To develop airfield and landside alternatives necessary to accommodate anticipated demand over the twenty-year planning period, the following key issues were considered as part of the alternative analysis:



**TABLE 5-1
MASTER PLAN UPDATE KEY ISSUES**

Key Issues	Description
Runway Pavement Rehabilitation and Strength	Based upon FDOT’s Pavement Evaluation Report for FPR, portions of the existing airfield require immediate rehabilitation and overlay. Although some demand exists for strengthening the airfield pavement beyond its current published strength of 60,000 pounds, the fleet mix does not currently exceed the FAA’s 500 operations benchmark.
Airfield Configuration and Runway Length	Based upon existing and forecast demand, the current airfield was evaluated based upon airport operational requirements (GA and Commercial), efficiency and safety. The master plan update is compliant with both Florida Aviation System Plan (FASP) and FAA design and safety requirements. Recommendations provided herein are consistent with the St. Lucie County Comprehensive Plan
Commercial Passenger Service	The viability of providing limited commuter or air carrier commercial service operations at FPR over the twenty-year planning period was considered and requirements identified. Development of FPR as a commercial service airport is in compliance with FASP long-term recommendations.
Air Traffic Patterns	Approach, departure and touch and go training patterns were assessed to mitigate potential impacts to noise sensitive communities while maintaining the operational needs of the airport.
Aircraft Technology	Use of new technologies (i.e. NextGen, LAAS, Noise Monitoring Systems, Bird Strike Prevention Radar, etc.) and potential modifications to existing operations were evaluated to mitigate potential environmental and drainage impacts while improving safety, operational capacity and resource use.
Airfield Capacity	With the addition of Runway 10L-28R, the airfield operational capacity is unlikely to exceed the 60 percent planning threshold within the twenty-year planning period.
Environmental Impacts	On airport and off airport land use was studied to minimize and mitigate potential impacts to the ecosystem, wetlands, and any endangered or protected species.
Aircraft Noise	Some residential and noise sensitive areas (i.e. schools) are located within five miles of the airfield. However, none are located within the 60 DNL noise contour (Figure 5-2).
On and Off - Airport Land Use	<p>On-airport development was reviewed for highest and best use based upon the airport’s future role, existing and forecast demand, and financial viability, including its use as a multi-modal facility. Potential on-airport commercial/industrial development was evaluated for alternative revenue generation. All on-airport development was also examined for potential impacts to contiguous noise-sensitive zones.</p> <p>Off-airport residential land use should be limited to areas outside the existing and future runway clear zones and noise impact areas. Mixed use, commercial and industrial land development should be evaluated to limit impacts to existing or future airport operations.</p>
Financial Feasibility	The feasibility of proposed projects related to operating revenue and funding capacity was evaluated including alternative funding sources. A detailed evaluation is provided in Chapter 7 of this report.



5.2 Local Planning and Development

Proposed airfield and landside alternatives at FPR considered the policies and objectives outlined in the St. Lucie County Comprehensive Plan (Comprehensive Plan) with regard to land development and compatibility around civilian airports and to a limited extent transportation concurrency. Florida Growth Management Laws, specifically Chapter 2005-290, defines Capital Improvement requirements in relation to the Comprehensive Plan and Florida Department of Transportation Comprehensive Plan.

As required by Chapter 2005-290, members of the St. Lucie County Transportation Planning Organization, City of Port St. Lucie and City of Ft. Pierce Planning Departments, and representatives from St. Lucie Village, who participated on the Project Technical Advisory Committee (TAC), were involved in the planning and programming of transportation facilities at the airport. Proposed development was also coordinated with the St. Lucie Planning and Development Services Department. Recommendations from each of these organizations are included in this report. Therefore, recommended airport development was provided to the St. Lucie County Planning and Development Services and Transportation Planning Departments for inclusion into the County's long-range transportation and comprehensive plans. The long-range transportation plan should include both long and short-range strategies to preserve the existing transportation structure as well as improve mobility.

The long-range plan assessed capital investment and other measures necessary to enhance existing transportation corridors. Based upon coordination with the TAC, transportation concurrency to a limited degree was considered with regard to proposed landside development on the airport as required based upon Policy 2.7.1.7 of the St. Lucie County Comprehensive Plan. This states that "the Master Plan for the St. Lucie County Airport shall be updated every five years to evaluate concurrency of actual airport development with Master Plan and to determine future development concurrent with plans of the Florida Department of Transportation (FDOT), Federal Aviation Administration (FAA), Florida Aviation System and any other plans prepared pursuant to Chapter 380 F.S."⁷ Transportation concurrency considers the impact of proposed aviation development on local roads to determine if sufficient capacity is or will be available. Detailed project trip generation and roadway capacity determinations were not part of the scope of this project; therefore, it is recommended that detailed trip generation information be provided as part of future landside development.

⁷ St. Lucie County Comprehensive Plan, Transportation – March 5, 2002, Revised – January 2004



5.2.1 On/Off Airport Land Use and Zoning

Florida Statute 333.03 and St. Lucie County Ordinance No.09-013, *Land Development Code*, addresses on and off-airport land use. According to Florida Statute 333, *Airport Zoning*, Section 03, 'every political subdivision having an airport hazard area within its territorial limits shall adopt, minister and enforce...airport zoning regulations for such airport hazard areas. Further, when any airport hazard is located wholly or partly outside the territorial limits of the airport political subdivision, the airport political subdivision in conjunction with the political subdivision within which the airport is located shall either:

1. Adopt, administer and enforce airport zoning regulations by interlocal agreement in accordance with Chapter 163 or,
2. By ordinance or resolution, adopt/create a joint airport zoning board to administer and enforce airport zoning regulations applicable to the airport hazard in question'.

Airport zoning as outlined in both FS 333 and St. Lucie County Ordinance provides guidance with regard to noise notice zones, airport height and hazard zones and clear zones in an effort to minimize potential impacts to its citizens. **Ordinance No 09-013, Chapter 4, 4.00, *Airport Overlay Zones***, established certain zones which include all of the land lying beneath the approach surfaces, transitional surfaces, horizontal surfaces, and conical surfaces as they apply to the St. Lucie County International Airport. The purpose of this ordinance is to prevent the creation, establishment, or maintenance of hazards to aircraft while establishing height limitations within the established zones. Further, "no use may be made of land or water within any zone established by this section in such a manner as to create electrical interference with navigational signals or radio communication between aircraft and the airport; result in glare in the eyes of pilots using the airport; impair visibility in the vicinity of the airport; operate or install lights which are misleading or dangerous to aircraft operation; create bird strike hazards, or otherwise in any way endanger or interfere with the landing, takeoff, or maneuvering of aircraft intending to use the airport."⁸

FAA Advisory Circular 150/5200-33B, *Hazardous Wildlife Attractants On or Near Airports*, has recently been revised (January 2010) and designate that all water management facilities (i.e. wastewater treatment facilities) are considered a hazardous wildlife attractant (**Section 2-3 (d, e and f)**). The FAA recommends against the construction of any solid waste and water management facilities including associated settling ponds within the following minimum separations of a public-use airfield:

⁸ Chapter IV, Special Districts, 4.00.00 Airport Overlay Zones, Land Development Code, St. Lucie County, Florida codified through Ordinance No. 09-013, adopted May 19, 2009.



- ‘Airports serving piston powered aircraft require a minimum 5,000 foot separation from the edge of the Airport Operating Area (AOA) to edge of the hazardous wildlife attractant. (Section 1-2)
- Airports serving turbine powered aircraft require a minimum 10,000 foot separation from the edge of the Airport Operating Area (AOA) to edge of the hazardous wildlife attractant. (Section 1-3)
- For all Airports, FAA recommends a distance of 5 statute miles (26,400 feet) between the farthest edge of the AOA and the hazardous wildlife attractant in order to protect the approach, departure and circling airspace. (Section 1-4)’

Since FPR serves turbine powered aircraft, facilities that may attract wildlife can be constructed at a minimum distance of no less than 10,000 linear feet⁹ from the farthest edge of the AOA. However, a preferred recommendation is 5 statute miles from the AOA. Further, under Section 4-3 of **AC 150/5200-33B**, ‘Airports that have received federal grant-in-aid are required by their grant assurances to take appropriate actions to restrict the use of land next to or near the airport to uses that are compatible with normal airport operations...Failure to do so may lead to noncompliance with applicable grant assurances and could impact the placement of airport development projects or certification under FAR Part 139’ (**AC 150/5200-33B**, Section 3.2).

Further as defined by FS 333.03, “where an airport authority or other governing body operating a publicly owned, public use airport has conducted a noise study in accordance with the provisions of **14 CFR Part 150**, neither residential construction nor any educational facility as defined in Chapter 1013, with the exception of aviation school facilities, shall be permitted within the area contiguous to the airport defined by the outer noise contour that is considered incompatible with that type of construction as defined within **14 CFR Part 150, Appendix A** or an equivalent noise level as established by other types of noise studies.”¹⁰

According to FAA Airports District Office guidance, the typical noise and land use compatibility standard is based upon the Day Night Level (DNL) of 65 dBA. However, FAA does provide the option to local jurisdictions based upon determined needs and values to establish a more stringent standard. Therefore, based upon input from residents concerning the perceived adverse impacts of noise beyond the established DNL 65 dBA contour, the County has adopted a local noise and compatibility standard based upon DNL 60 dBA standard for future land use planning.

⁹ Solid Waste Facilities/Landfills can be constructed no less than 6 statute miles from the airport’s property boundary (AC 150/5200-34A, *Construction or Establishment of Landfills Near a Public Use Airport*).

¹⁰ Florida Statute 333.03, Power to Adopt Airport Zoning Regulations, Section 2(c)



St. Lucie County Comprehensive Plan

St. Lucie County regulates land used both on and adjacent to FPR through rules and regulations established in the St. Lucie County Comprehensive Plan and Florida Statute Chapter 333. Chapter 2, *Transportation Element*, of the Comprehensive Plan was updated via Ordinance 07-007. This chapter now includes former **Chapters 3, *Mass Transit Element***, and **4, *Port and Aviation Element***. Certain recommendations were approved including a 4-mile airport notification to residential developers requiring the disclosure of the existence of the airport and aircraft operating in the area, limitation of school development where F.S. Chapter 333 prohibits schools off the ends of runways, and noise easements and/or sound insulation for new residential development in the 60 dBA DNL noise contour based upon the accepted **FAR Part 150 St. Lucie County International Airport Noise Study, 2005**.

There are, however, additional issues that have become of increasing concern to airport operators including protecting approach and departure zones from incompatible land use and obstructions to air navigation. Incompatible land uses include: residential development, land uses that would increase wildlife hazards, tall structures, towers that may create electrical interference with radio transmissions or NAVAIDs, and lighting or glare that could create a hazard for pilots using the airport. Furthermore, as a condition of airport grant assurances, the County is required to protect the Airport from incompatible development.

The County currently does have an Airport Overlay Zone in the Land Development Code, which addresses issues dealing with incompatible land uses. Further, the St. Lucie Comprehensive Plan states:

- “All areas adjacent to existing airport locations are restricted to airport compatible land uses.
- The County will make every effort to purchase aviation easements, acquire land and residences and require compatible land uses in areas consistent with the high noise areas as delineated in the FAR Part 150 Study.
- The County shall follow existing and projected noise levels as delineated in the FAR Part 150 Study when considering zoning changes and building permits for new construction or major reconstruction and prohibit construction of noise sensitive structures within the 65 Ldn contour of the airport.”¹¹

As part of this master plan update, the Overlay District within the St. Lucie Comprehensive Plan will be updated to reflect proposed development.

¹¹ St. Lucie County Comprehensive Plan, 2002 and The 2005 FAR Part 150 Noise Study Update, St. Lucie County International Airport.



Based upon the recommendations outlined in the 2005 FAR Part 150 Noise Study and the St. Lucie County Evaluation and Appraisal Report (October 2008), the following objectives and policies are being incorporated into the St. Lucie County Comprehensive Plan:

- **“Objective 1.1.15:** The County shall continue to provide for the location of only compatible uses of land within the vicinity of the St. Lucie County International Airport.
- **Policy 1.1.15.1:** Enforce Section 4.00.00 of the Land Development Code which identifies those properties likely to be impacted from development activities at the St. Lucie County International Airport and specifies what special measures or activity restrictions will be necessary in the development of these properties to minimize any adverse impacts.
- **Policy 1.1.15.2:** Enforce Section 4.00.00 of the Land Development Code which enacts an Airport Height Regulation Ordinance, and encourages as appropriate, the participation of all other affected units of government in the implementation of this ordinance.
- **Policy 1.1.15.3:** Verify and relocate as necessary the 65 Ldn line within the Airport Master Plan.
- **Policy 1.1.15.4:** St. Lucie County shall continue to work toward the phasing out of incompatible land uses within the 65 Ldn line as identified in the Airport Master Plan.”¹²

Noise Impact and Notice Zones

According to FAA, FAR Part 150 provides recommended guidelines for noise-land use compatibility. “FAR Part 150 establishes that the responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with local authorities”¹³. Based upon information provided in the 2005 FPR Part 150 Study, the Study Group adopted a local noise and land use compatibility standard of DNL 60 dBA rather than the federal standard of DNL 65 dBA.

Airport noise notice zones typically are defined as those zones in which the limits are represented by DNL 60 dBA to DNL 64.99 dBA noise contour range. However, since the recommendations of the 2005 FPR Part 150 Study lowered the local noise and land use compatibility standard to DNL 60 dBA, the noise notice zone limits for FPR include property within DNL 55 dBA and DNL 60 dBA contours.

As defined in Florida Statutes, Title XXV, Chapter 333, the noise impact zone is defined:

¹² St. Lucie County Evaluation and Appraisal Report, October 2008

¹³ Federal Aviation Administration Federal Aviation Regulations 14 CFR Part 150, Noise Studies



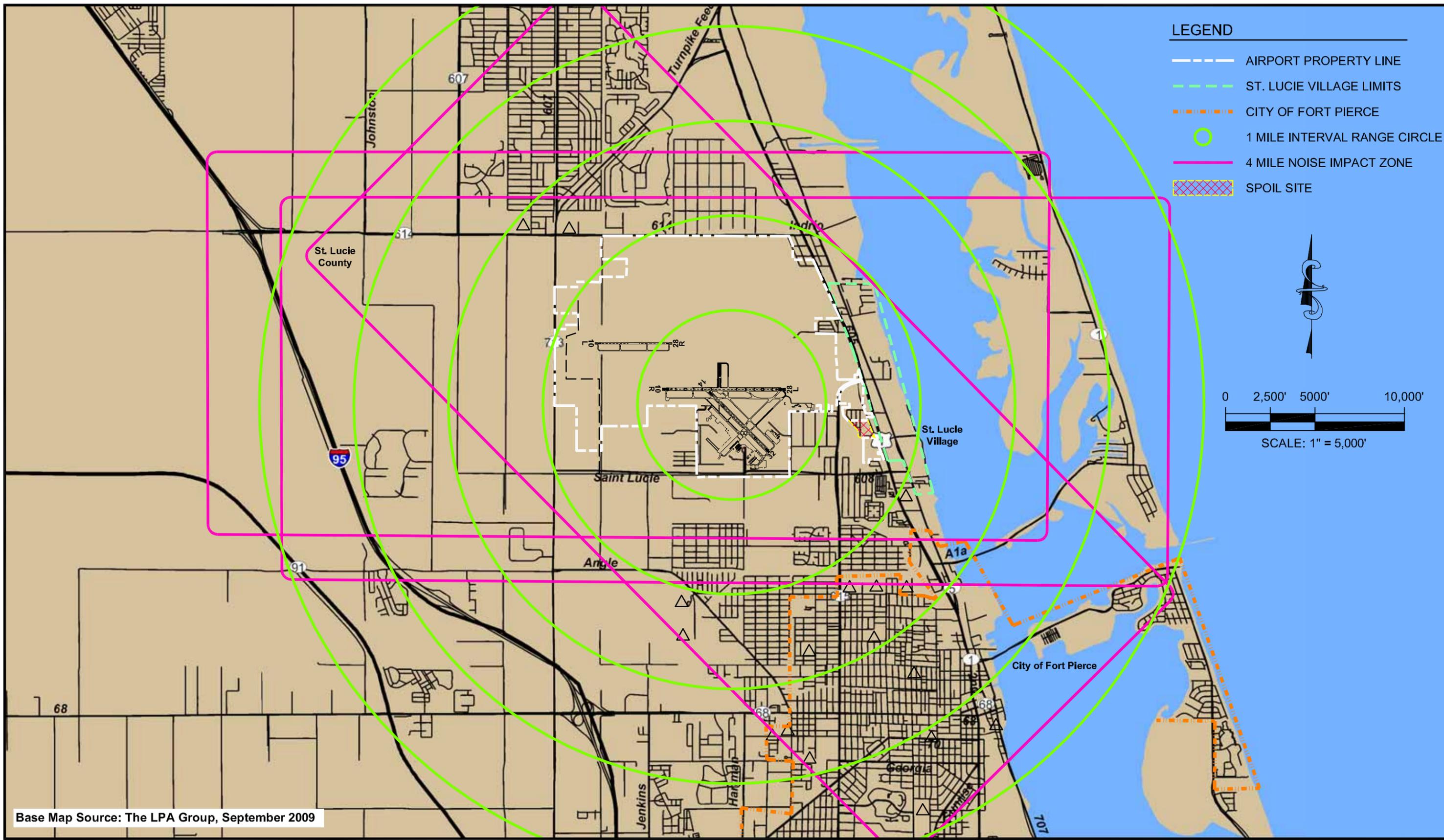
1. If a FAR Part 150 Study has been conducted: “neither residential construction nor any educational facility as defined in Chapter 1013, with the exception of aviation school facilities, shall be permitted within the area contiguous to the airport defined by an outer noise contour that is considered incompatible with that type of construction by 14 CFR Part 150, Appendix A, or an equivalent noise level as established by other types of noise studies”¹⁴.
2. Where a 14 CFR Part 150 Study has not been conducted, “neither residential construction nor any educational facility as defined in Chapter 1013, with the exception of aviation school facilities, shall be permitted within an area contiguous to the airport measuring one-half the length of the longest runway on either side of and at the end of each runway centerline”¹⁵.

Therefore, based upon the recommendations made in the 2005 FPR Part 150 Noise Study, the noise notice zone was defined as 4-miles off each runway end and 2-miles wide from the centerline as illustrated in **Figure 5-2**.

¹⁴ St. Lucie County Comprehensive Plan, Transportation – March 5, 2002, Revised – January 2004

¹⁵ Florida Statutes, Title XXV, Chapter 333

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St. Lucie County
International Airport
Master Plan Update

NOISE NOTICE ZONES

DATE
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5-2
FIGURE NO.



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Height and Hazard Zones (Ordinance 4.00.3)

Height and Hazard Zones associated with FPR are defined in **St. Lucie County Ordinance 09-013, Chapter 4, Section 4.00.3** as well as **St. Lucie County Comprehensive Plan, Chapter 2, Transportation**, and are based upon Title 14, Code of Federal Regulations, Part 77 guidelines. Therefore, in order to ensure that Part 77 guidelines are not exceeded and that no structure or obstruction (manmade or natural) is permitted that would raise a minimal obstruction clearance altitude, a minimum vectoring descent altitude or decision height, all cell towers or other structures/obstructions which exceed 150 feet or penetrate the Airport's Part 77 surface, must provide notice to FAA and FDOT prior to construction. **Figure 5-3, Civilian Height and Hazard Zones**, illustrates the elevation limitations associated with airfield facilities.

In addition, if proposed development contiguous to FPR exceeds 200 feet, according to FAR Part 77, it is considered unlawful and a violation of the St. Lucie County Zoning Ordinance and Comprehensive Plan to establish, maintain or continue a use within the surface limits of the height and hazard zones that would interfere with the operation of airborne aircraft. Therefore, no structure shall be erected, altered, or maintained, and no tree shall be allowed to grow in any zone created by this Code to a height in excess of the applicable height limit established per zone as follows:

- *“Primary Zones.* Established as the same height as the elevation of the nearest point on the respective runway centerlines.
- *Visual Approach Zones.* Slope one (1) foot upward for each twenty (20) feet outward beginning at the end of and at the same elevation as the primary zone extending to a horizontal distance of ten thousand (10,000) feet along the extended runway centerline.
- *Nonprecision Instrument Approach Zones.* Slope one (1) foot upward for each thirty-four (34) feet outward beginning at the end of and at the same elevation as the primary zone extending to a horizontal distance of ten thousand (10,000) feet along the extended runway centerline.
- *Precision Instrument Approach Zones.* Slope one (1) foot upward for each fifty (50) feet outward beginning at the end of and at the same elevation as the primary zone extending to a horizontal distance of ten thousand (10,000) feet along the extended runway centerlines; thence slope upward one (1) foot vertically for each forty (40) foot horizontally for an additional horizontal distance of forty thousand (40,000) feet along the extended runway centerlines.
- *Transitional Zones.* Slope one (1) foot upward for each seven (7) feet outward beginning at the sides of and at the same elevation as the primary zone and the approach zone, extending to one hundred seventy-four (174) feet above mean sea level. In addition to the foregoing, there are established height limits sloping one (1) foot upward for each seven (7) feet outward beginning at the sides of and at the same



elevation as the approach zone, extending to where they intersect the conical zone. Where the precision instrument runway approach zone projects beyond the conical zone, there are established height limits sloping one (1) foot upward for each seven (7) feet outward beginning at the sides of and at the same elevation as the approach zone, and extending a horizontal distance of five thousand (5,000) feet measured at ninety-degree angles to the extended runway centerlines.

- *Horizontal Zone.* Established at one hundred fifty (150) feet above the airport elevation or at a height of one hundred seventy-four (174) feet above mean sea level.
- *Conical Zone.* Slopes one (1) foot upward for each twenty (20) feet outward beginning at the periphery of the horizontal zone one hundred fifty (150) feet above the airport elevation extending to a height of three hundred fifty (350) feet above the airport elevation.
- *Other Areas.* In addition to the height limitations imposed above, no structure or obstruction will be permitted in St. Lucie County that would cause a minimum obstruction clearance altitude, a minimum descent altitude, minimum vector altitude or decision height to be raised or that would impose a climb gradient for any runway departure at St. Lucie County International Airport¹⁶.

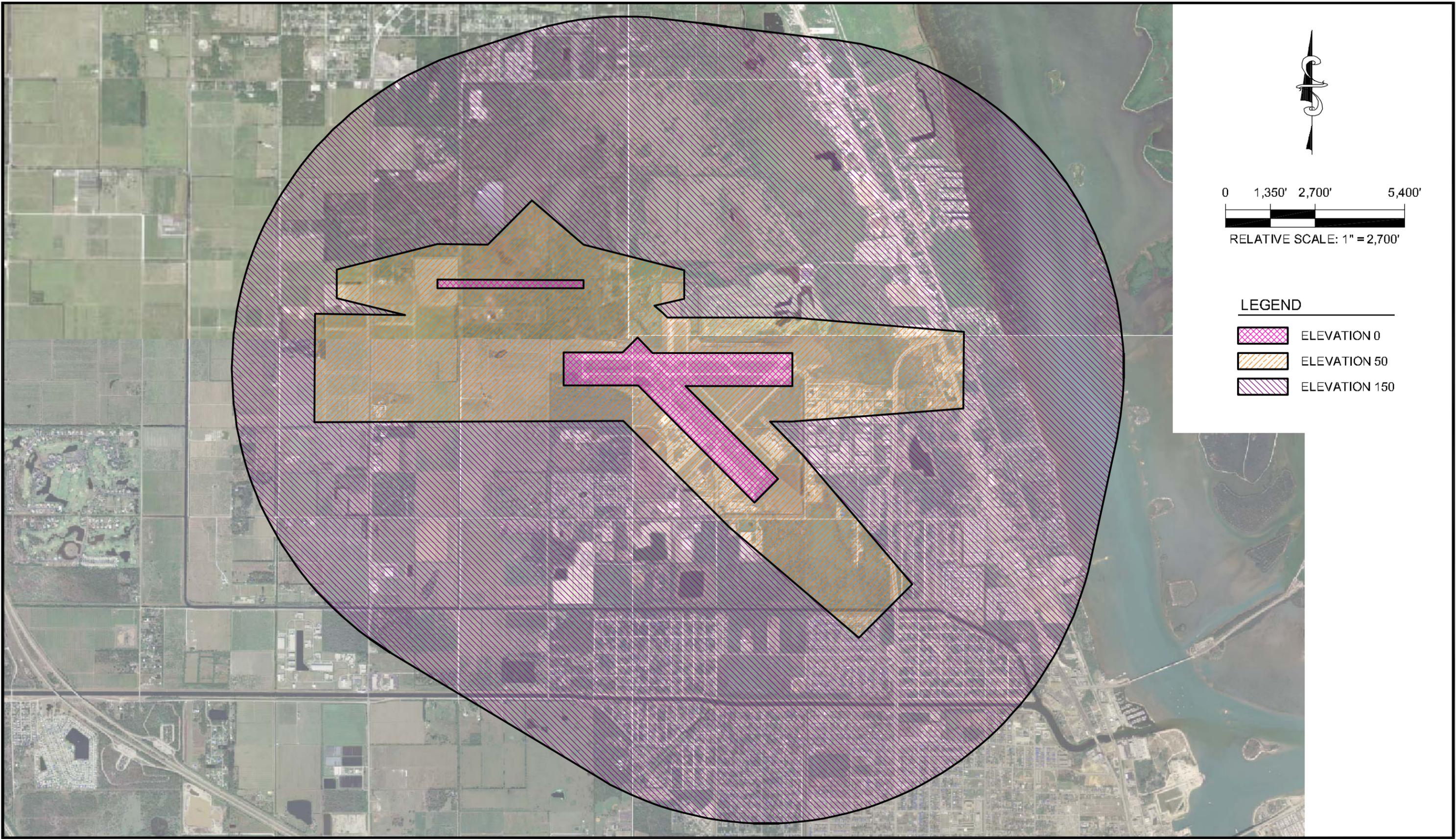
Further according to Land Development Code 10-1509, October 15, 2009, “A variation from the height requirements of Section 4.01.00, *Airport Overlay Zones*, up to one hundred twenty percent (120%) of the maximum allowed where the FAA has issued a no hazard determination”. However, “any variation impacting the Airport runway safety/clear zone shall not be approved”.¹⁷ Thus, no use is to be made of any land or water within the zones established in a manner which would endanger or interfere with the landing, takeoff or maneuvering of aircraft intending to use the airport.

It is the recommendation of this document that additional airport zoning regulations should be adopted to restrict new incompatible uses, activities or construction within existing and future runway clear zones which impact normal operations or endanger public health, safety and welfare by resulting in congregations of people, emissions of light or smoke or the attraction of birds.

¹⁶ St. Lucie County Zoning Ordinance and 2004 Comprehensive Plan

¹⁷ St. Lucie County Land Development Code 10-1509, October 15, 2009

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St. Lucie County
International Airport
Master Plan Update

CIVILIAN HEIGHT & HAZARD ZONES

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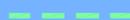
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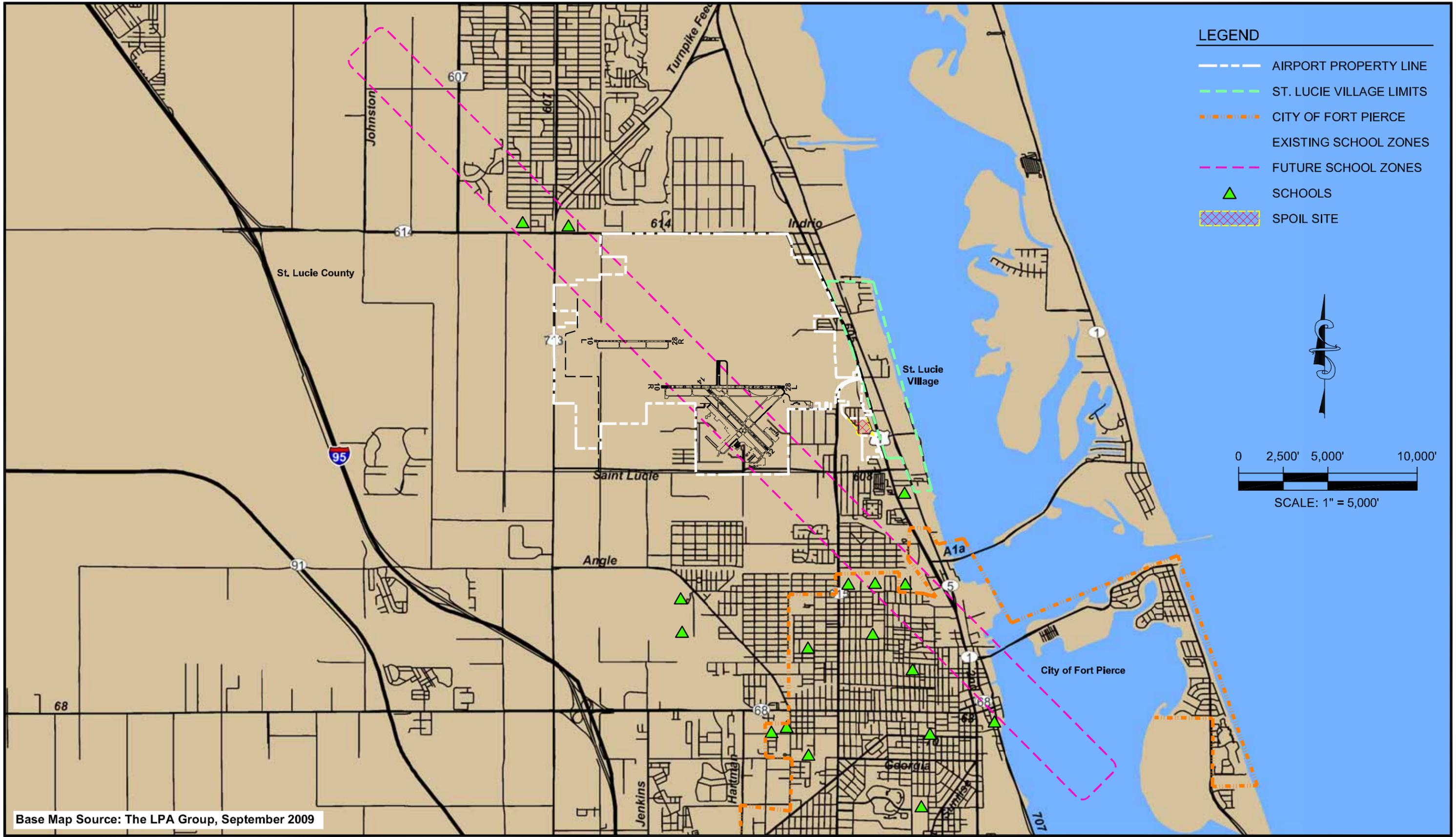
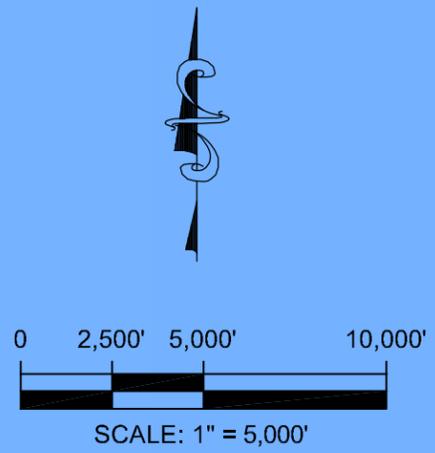


School Regulation Zones

Based upon the above zoning requirements outlined in both FS 333 and St. Lucie County Zoning Ordinance, construction of an educational facility, including public or private school, at either end of a runway of a publicly owned, public-use airport within an area which extends 5 miles in a direct line along the centerline of the runway, and which has a width measuring one-half the length of the runway. Exceptions approving construction of an educational facility within the delineated area shall only be granted when the political subdivision administering the zoning regulations makes specific findings detailing how the public policy reasons for allowing the construction outweigh health and safety concerns prohibiting such a location.

According to the FPR Part 150 Noise Study, four schools are located within the extended centerline of Runway 14 and 32, and no schools are located within the extended centerlines of Runway 10R-28L and 10L-28R. Since the threshold of Runway 14 is located within the object free area of Runway 10R-28L, it was recommended that Runway 14 be extended 945 feet to accommodate a wider range of corporate aircraft while removing a complex intersection. Based upon this recommendation, as illustrated in **Figure 5-4**, *School Construction Zones*, the future width of the school construction zone would increase by approximately 473 feet and the length beyond Runway 14 would increase by 945 feet. Even with the extension, no additional schools, beyond the initial four, would be located within the school construction zone.

- LEGEND**
-  AIRPORT PROPERTY LINE
 -  ST. LUCIE VILLAGE LIMITS
 -  CITY OF FORT PIERCE
 -  EXISTING SCHOOL ZONES
 -  FUTURE SCHOOL ZONES
 -  SCHOOLS
 -  SPOIL SITE



Base Map Source: The LPA Group, September 2009



**St. Lucie County
International Airport
Master Plan Update**

SCHOOL CONSTRUCTION ZONES

DATE
06/07/2010

5-4
FIGURE NO.

Y:\Planning\FPR - St. Lucie County\MPU\Figures\Fig 5-4_School Construction Zones.dwg June 07 2010-10:26



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5.3 New Regional Airport Alternative Site

An influx of residents from South Florida and the Northern and Western United States may merit future air carrier commercial passenger services at St. Lucie County International Airport. Demand for commercial service within the region, according to the Florida Aviation System Plan, will continue and FPR has and continues to be designated as a potential site for future commercial passenger service development. Still because the existing airport is partially surrounded by residential development and current airport property includes environmentally sensitive zones, at the request of the Board of County Commissioners, the economic viability of developing a commercial service airport at an alternate or “green” site was considered.

Previous plans, including the 1993 Master Plan Update, recommended the long-term extension of the main east/west runway to 10,000 feet and the construction of an 8,000 foot parallel runway to the north to accommodate future FAR Part 121 commercial service aircraft (i.e. B737-300) operations. However, unlike its predecessor, recommended development as outlined in the previous 2002 Airport Master Plan Update was based strictly upon general aviation demand only. Therefore, pursuit of commercial service facilities at FPR was discontinued removing all commercial service facility and airport land use recommendations from the master plan narrative report and airport layout plan. Still both the 1993 and 2002 Master Plan Updates as well as 2005 FAR Part 150 study all recommended development of a north parallel runway, which would require the relocation of the existing FPL power transmission lines.

It is important to note however that when airport owners or sponsors, planning agencies, or other organizations accept funds from FAA-administered airport financial assistance programs, they must agree to certain obligations (or assurances). These obligations require the recipients to maintain and operate their facilities safely and efficiently and in accordance with specified conditions. Assurances appear either in the application for Federal assistance and become part of the final grant offer or in restrictive covenants to property deeds. The duration of these obligations depends on the type of recipient, the useful life of the facility being developed, and other conditions stipulated in the assurances.

A list of major obligations that an airport can incur includes, but is not limited to, the following:

- Prohibition of exclusive rights
- Use of airport revenue
- Proper maintenance and operation of airport facilities
- Protection of approaches
- Keeping good title of airport property
- Compatible land use
- Availability of fair and reasonable terms without unjust discrimination



- Adhering to the approved airport layout plan
- Self-sustainability
- Sale or disposal of Federally acquired property
- Preserving rights and powers
- Using acceptable accounting and record-keeping systems
- Compliance with civil rights requirements, etc.

When airport owners and operators accept Federal grants, they agree to preserve and operate their facilities in a safe and efficient manner and comply with certain conditions and assurances. These obligations can span different airport development grant programs, including the Federal Aid to Airports Program (FAAP), the Airport Development Aid Program (ADAP), and the Airport Improvement Program (AIP). Airports owners should be aware that obligations incurred under each program vary.

In addition to assurances, development of a green site requires extensive justification and funding. A cost-benefit analysis must first be completed to determine if justification is available for development of a green site facility. This is followed by a site selection process, environmental impact study, master plan, design, permitting, etc. This process can take up to 20 years and may require the closing of nearby airports both in and contiguous to St. Lucie County (i.e. Martin County) since demand may not warrant continued funding in support of these airports. Further, if development requires the closure of FPR, the FAA and FDOT may require the County to repay prior grant assurances provided for the safe operation of the airport.

Since the viability of developing an alternative airport site to accommodate commercial service is beyond the realm of this study, it is recommended that the Board of County Commissioners (BOCC) consider initiating a market study and benefit cost analysis to evaluate the possibility of an alternative airport site if and when demand warrants.

5.4 Development Considerations

To meet current and future aviation demand and to achieve the overall goals of the Airport, several airside, landside and GA requirements were identified in **Chapter 4, Demand/Capacity Analysis and Airport Facility Requirements**. Prior to determining the final alternatives, these aviation-specific requirements were considered. In general, similar criteria were used to measure the effectiveness and the feasibility of the various growth options available, and are grouped into four general categories:

- **Operational** – the selected development alternative should be capable of meeting the Airport’s facility needs as identified for the planning period. Preferred options should resolve any existing or future deficiencies as indicated by Federal Aviation Administration (FAA) design, safety and security criteria.



- **Environmental** – Airport growth and expansion may impact both the airport and surrounding environs; therefore, the selected plan should seek to mitigate impacts both within and adjacent to the airport properties. Alternatives should also seek to obtain a reasonable balance between expansion needs and off-site acquisition and relocation needs while being sensitive to potential environmental impacts.
- **Cost** - Some alternatives may result in excessive costs as a result of expansive construction, acquisition and/or other development requirements. In order for a preferred alternative to best serve the airport and the community, it must satisfy development needs at a reasonable cost.
- **Feasibility** - The alternative concepts must be acceptable to the FAA, FDOT, St. Lucie County, and the community served by the airport, and should be economically feasible while meeting a variety of diversified objectives.

These evaluation criteria address economic, operational, environmental and other issues which are crucial to strategic long-term planning decisions. The following sections use these criteria to determine alternatives which best meet the airport’s long-term planning goals and development needs as identified in **Chapter 1, Sections 1.4, Key Issues**, and **Section 1.5, Goals and Objectives**, of this report.

5.4.1 St. Lucie County Planning and Development

As noted earlier, all recommended airport development must be consistent with federal guidance, Florida Statutes, growth management and concurrency requirements as well as FDOT Transportation Plans. In addition, any approved development incorporated into the long-range transportation plans and Planning and Development Services documentation for St. Lucie County was also considered as part of the development process.

Plans are also on-going for development west of the airport property in response to declining citrus production and continued residential demand. The St. Lucie County Planning and Development Services Department developed a pro-active plan for future growth in St. Lucie County following principles set forth in the Towns, Villages and Countryside Element (TVC) of the St. Lucie County Comprehensive Plan.

The purpose of the TVC is to “encourage a pattern of development that will preserve the rural character while still providing for future growth”. “Using the principles of Traditional Neighborhood Design (TND), the strategy for new settlement in the undeveloped areas requires a sustainable growth pattern characterized by a mix of uses, building types and



income levels as well as pedestrian-friendly block and street networks. The TVC preserves a significant amount of public open space, promotes strategies for viable agriculture, and helps mitigate the environmental impact of new development. The TVC Element applies only to the Special Area Plan for North St. Lucie County.”¹⁸ **Figure 5-5** illustrates the boundary of the approved¹⁹ TVC development area.

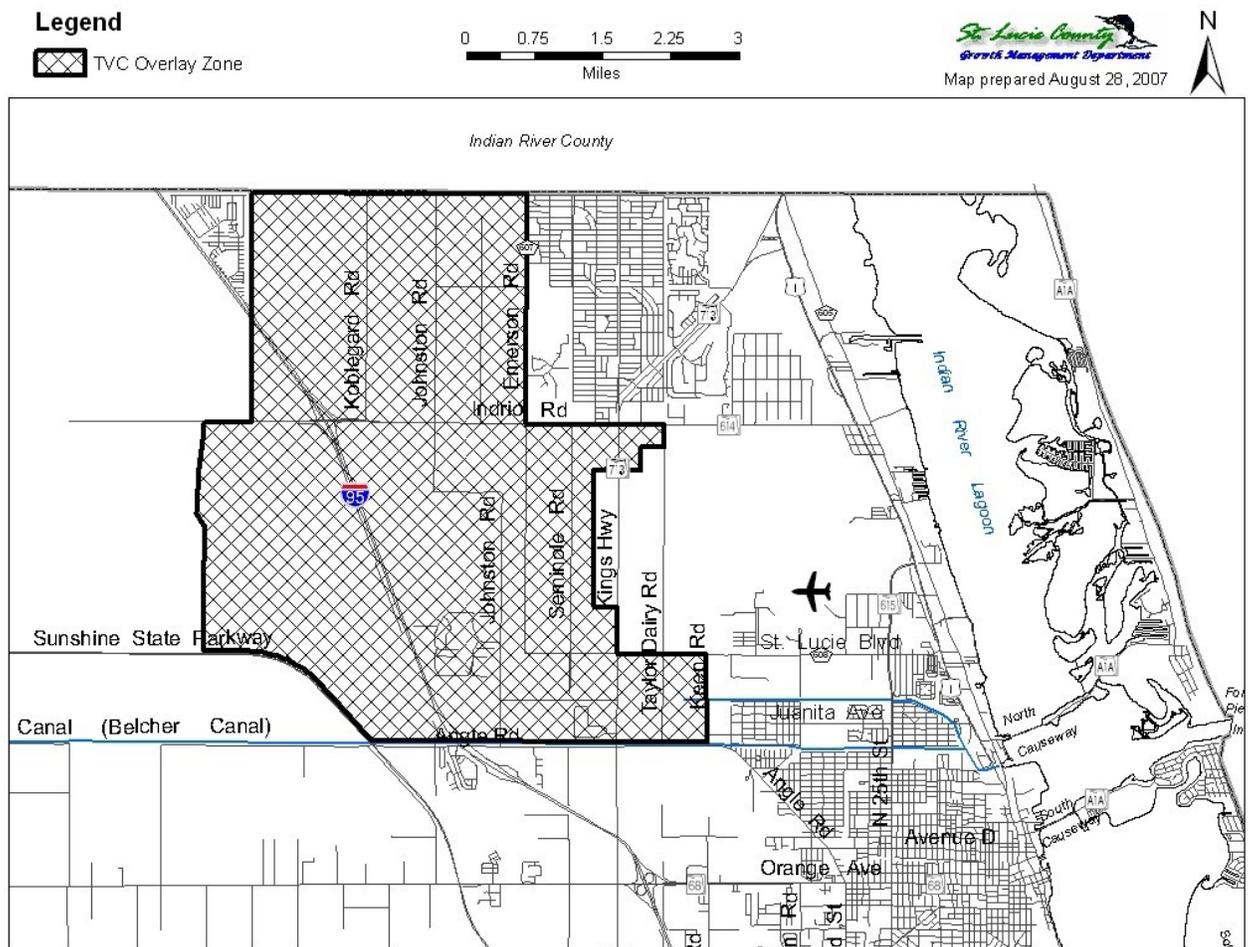
The TVC was recently adopted (October 2009) into the St. Lucie County Comprehensive Plan and Land Development Regulations. It is important to note that this development would be located within the approach paths of both Runways 10R and 10L and departure paths of Runways 28L and 28R. Thus, as part of this master plan update, coordination with the St. Lucie County Metropolitan Planning Organization and Planning and Development Services Department as well as City of Ft. Pierce and Port St. Lucie Planning Departments was critical in the creation and implementation of long-term growth opportunities and conflict avoidance over the twenty-plus year planning period.

Based upon discussions held with Ms. Kara Woods of St. Lucie County Planning and Development Services Department on September 15, 2009, the area west of the airport has a number of environmental issues even though its land use is identified as mixed use. Thus, it is anticipated that this property will remain undeveloped or established as conservation. Further, because of specific land use criteria dictated in the St. Lucie Comprehensive Plan, the property contiguous to the airport can only be used for business or industrial development.

¹⁸ Towns, Villages and The Countryside, A New Pattern of Settlement for North St. Lucie County, Comprehensive Plan Amendments, *Treasure Coast Regional Planning Council with and for the citizens of St. Lucie County, March 15, 2006, page 3-ii.*

¹⁹ The Towns, Villages and the Countryside Amendment was approved by the Department of Community Affairs (DCA) as of August 28th, 2009

Figure 5-5
Towns, Villages and Countryside Element



St. Lucie County Planning and Development Services Department, August 2007

Further in an effort to coordinate long-term planned improvements, members of the St. Lucie County Transportation Planning Organization, City of Ft. Pierce and City of Port St. Lucie Planning Department, St. Lucie Village representatives, and BOCC appointees participated as members of the Technical Advisory Committee. Coordination with St. Lucie Planning and Development Services²⁰ and Legal²¹ Departments occurred throughout the master plan process.

²⁰ Kara Woods, Director of St. Lucie Planning and Development Services Department

²¹ Heather Young, Assistant County Attorney, St. Lucie County



Although the current St. Lucie County Comprehensive Plan designates FPR as a general aviation airport, the plan does not limit the possibility for FPR to support commercial passenger service under FAR Part 139 criteria. Florida Growth Management Law 333 amended in 2007 now exempts airport terminals, hangars and air cargo facilities from concurrency requirements. However, the airport and its tenants will still need to provide concurrency for infrastructure necessary to support non-aviation development including commerce and industrial parks. In order to determine concurrency requirements, detailed trip generation will need to be acquired, which is beyond the scope of this master plan update. Therefore, as part of planned non-aviation development, potential impacts on utilities (i.e. water, sewer, power, etc.) and roadways must be evaluated. However, it is important to note that in conjunction with this master plan update, a storm water master plan is being updated to obtain a Conceptual Environmental Resource Permit for recommended airport projects within a 10-year timeframe (2010-2020).

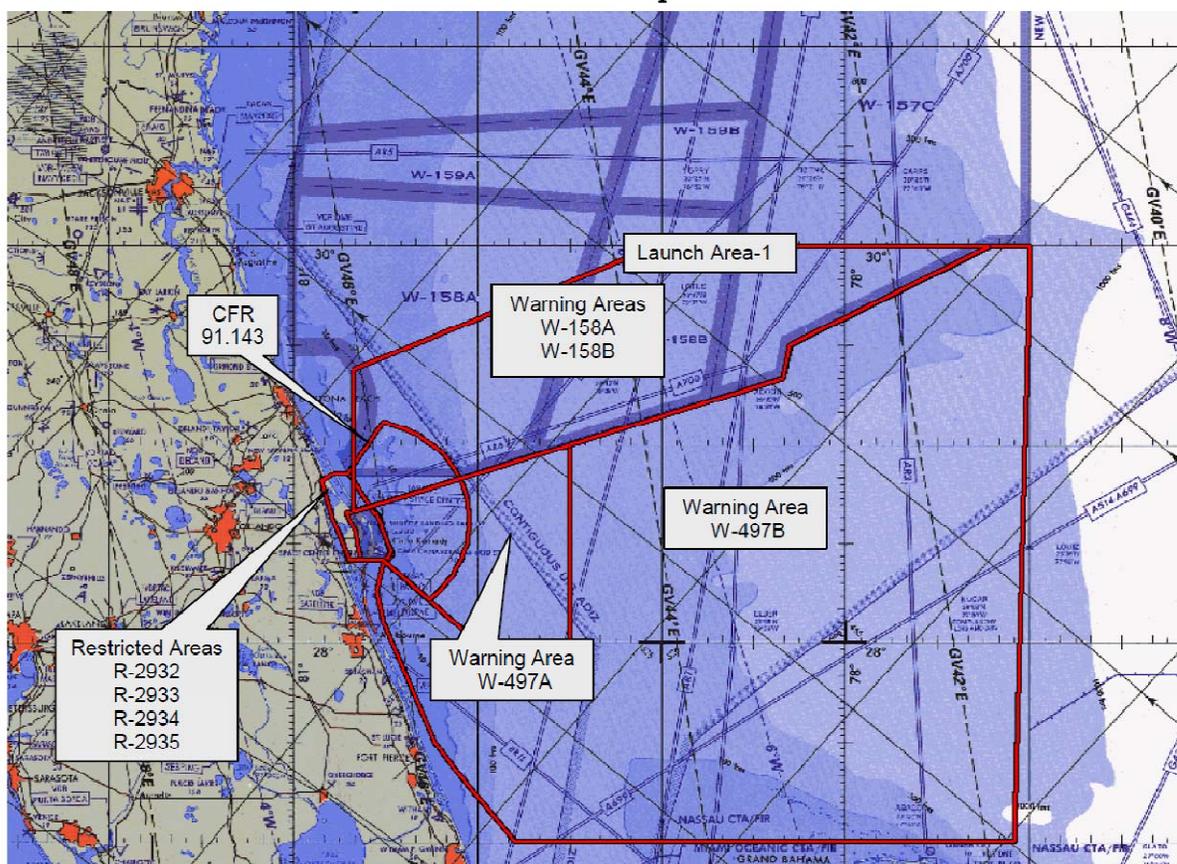
5.4.2 Airspace Limitations

In evaluating potential airfield development alternatives, specifically related to approach and departure procedures, limitations are based not only upon physical obstructions and/or noise mitigation procedures but also on airspace restrictions associated with commercial and military operating areas.

Other Airports

As noted in **Chapter 2, Inventory of Existing Conditions**, several airports including Vero Beach, Sebastian, Witham Field, etc. are located within a 25 nautical mile radius of the airport. With the exception of Vero Beach, all airports are currently designated as general aviation. To the north, Vero Beach Airport's Class E (with floor 700 feet above ground elevation) overlaps part of FPR's Class E airspace to the south. Less than 100 NM to the east is Warning Area W-497B, which is designated as a South Florida Low Control Area. This area is used for space vehicle launch and is designated as a National Defense Operating Area as illustrated in **Figure 5-6**. Aircraft operating to and from Freeport, Bahamas when W-497B is "hot" or active should fly south of the area and then fly parallel to the Florida coastline.

Figure 5-6
Restricted Airspace



Source: Restricted Airspace Map, Patrick Air Force Base, September 8, 2009

Aircraft flying west from FPR should be aware of military operating areas and military restricted areas associated with MacDill AFB Auxiliary and Avon Park operating areas. Aircraft are requested to avoid restricted areas when active and to coordinate with ATC when operating within both military operating and inactive restricted areas.

Existing Penetrations

Existing penetrations to the airport's FAR Part 77 surface include the Florida Power and Light Power Transmission Lines, which range in height from 65 to 79 feet above ground level, located to the west of Taylor Dairy Road. These power lines penetrate the FAR Part 77 surfaces of both Runways 10R and 10L. However, these power lines were determined according to FAA Aeronautical Study 1988-ASP-1934-OE to pose no hazard to air navigation. Although Runway 10R is equipped with a precision instrument approach, visibility is limited to no less than $\frac{3}{4}$ mile due to the location and height of the existing power lines within the approach surface and the lack of approach lighting.



The ARFF radio antenna is also located within the 7:1 transitional surface of Runway 28L, it was also, according to FAA determination (2008-ASO-3666-OE), deemed not a hazard to air navigation. Further, as a result of tree clearing, no other obstructions or penetrations are currently located within the Part 77 surface of Runway 10L-28R, and ATC line of sight requirements were accommodated.

Runway 14 is also clear of Part 77 obstructions; however, a warehouse/building is currently located within the transitional surface of Runway 32. The building is located off airport property east of Industrial 33rd Street and South of Industrial Avenue 1. Since existing FPR property does not include the entire Runway 32 runway protection zone, there are two options to avoid future incompatible land use:

- Acquisition of the Runway 32 RPZ property through either fee simple or aviation easement, or
- Implement a displaced threshold on Runway 32 approach which will relocate the RPZ onto existing airport property.

Both options will allow the airport control of this property while limiting the impacts of incompatible land use on airport operations. Each option was evaluated as part of the Alternative Development Scenarios provided in **Section 5.8** of this document.

Air Traffic Patterns and Noise Abatement Procedures

In an effort to be a “good neighbor” to nearby residential development, FPR management implemented several voluntary noise abatement measures based upon the findings of the 2005 Part 150 Noise Study. Historically, training operators utilized Runway 10R-28L for various training operations including Touch and Go operations, which affected residential areas east of the airport. Thus, based upon the recommendations of previous master plans, the Part 150 Noise Study determined that a parallel training runway should be constructed to the north and west of the existing primary runway so that training operations would remain primarily over airport or low density contiguous property.

In addition to the completed construction of parallel Runway 10L-28R, airport management has also implemented a number of voluntary measures to reduce aircraft noise impacts on surrounding communities. The airport provides voluntary noise abatement procedure operating handouts which encourages the use of these procedures by pilots.

The 2005 Part 150 Noise Study identified several methods of reducing aircraft noise impacts, as listed in **Table 5-2**, including the construction of the training runway (Runway 10L-28R), modification of aircraft approach and departure procedures, as well as an extension of Runway



10R and relocation of Runway 28L threshold. Although the FAA only recognizes noise impacts which fall within the 65 DNL contours, the Part 150 Study expanded these zones to include areas within the 60 DNL contours. Thus, the primary areas of concern included: St. Lucie Village, unincorporated residential development to the south and northwest, as well as a portion of the City of Ft. Pierce.

TABLE 5-2 NOISE COMPATIBILITY RECOMMENDATIONS	
Operational Measures	<ul style="list-style-type: none"> • Implement voluntary discouragement of Stage 1 aircraft operations unless for life safety, emergency or aircraft recertification • Maintain voluntary touch and go training procedures: <ul style="list-style-type: none"> ➢ Touch and go training permitted only between 8 am and two hours after sunset, Monday through Saturday. ➢ No touch and go training permitted on Sundays or Holidays • Runway 14 preferred for calm wind operations until construction of proposed parallel runway completed • Runway 10L-28R preferred for all training operations to extent possible • Recommend voluntary use of “close-in” noise abatement departure profiles for use by jet aircraft operators on all runways. • Study the feasibility of a 1,500 ft westward shift of Runway 10R-28L to alleviate over flight of aircraft over residential neighborhoods.
Land Use Measures	<ul style="list-style-type: none"> • Update County Airport Zoning Regulations to include: <ul style="list-style-type: none"> ➢ Noise Impact Zone within a 4-mile notification area ➢ Develop School Impacts Zones consistent with FS 333 ➢ Update Zoning regulations to encourage compatible land uses, by requiring sound insulation or easement for new residential construction within the 60 DNL. • Provide ability to County to purchase land, avigation easements or other remedies to minimize the development of non-compatible land use. • Routinely disclose of Noise Study and airport location to property owners and local realtors including publishing the noise map and a public notice in the local newspaper. • Acquire residential properties located within the 65 DNL extending eastward to railroad tracks. Approximately 6 homes. • Consider residential sound insulation for properties located within the 60 DNL contours.
Implementation Measures	<ul style="list-style-type: none"> • Pilot Education Program • Community Information Program • Routine Review of NCP Implementation • FAA ATCT Tower Order (New) • Traffic Pattern Notification Lights for Training Aircraft • Noise Office Staffing • Support the Recommendation of the FDOT District 4 Treasure Coast Airport Noise and Flight Training Assessment.
<p><i>St. Lucie County International Airport FAR Part 150 Noise Compatibility Study Update, February 2005, MEA Group Inc and Harris Miller Miller & Hanson, Inc.</i></p>	



Based upon existing and proposed residential development, airport development alternatives considered existing and future noise mitigation initiatives. Also as part of this master plan update noise contours associated with the approved airport development were created based upon FAA approved forecasts and fleet mix data in an effort to identify additional mitigation options, if needed, to decrease potential noise impacts on surrounding communities.

5.4.3 Environmental Considerations

In addition to noise concerns, portions of the existing airport property include wetlands and wildlife habitats. A number of wetlands are located south and north of training Runway 10L-28R, and wetland habitats have been denoted on the eastern boundary of the airport property. In conjunction with tree clearing associated with the construction of Runway 10L-28R, a tree mitigation area was established to the north of Runway 10L-28R. This area consists of approximately 110 acres of land, and can be relocated to another portion of the airfield if demand warrants.

According to previous master plans and local zoning, portions of property along the northeast boundary of the airport property are designated for conservation primarily associated with the Atlantic Coastal Ridge. The Atlantic Coastal Ridge forms the eastern border of the County and includes Hutchinson Island, the Indian River Lagoon, and the ridge which lies east of the North and South Savannas paralleling Indian River Drive south of Fort Pierce and US 1 to the north. According to the Comprehensive Plan and current zoning ordinance, the Atlantic Coastal Ridge is to be protected from future development. Therefore, alternative development considered existing and potential environmental impacts associated with proposed scenarios. Further, based upon committee approved development, an environmental overview was created (**Section 5.10.2**) to identify and mitigate potential environmental impacts.

5.4.4 Previous Development Recommendations

As part of the master plan process, it is useful to review and evaluate previous planning recommendations in relation to the short and long-term airport role as defined by the Technical Advisory Committee, Airport Tenants, Board of County Commissioners and St. Lucie County residents. Projects which may still be pertinent to long-term airport development were incorporated into alternative development scenarios.

Recommended development within the 1993 Master Plan Update was based upon current demand and the airport's future role as a commercial passenger and cargo airport supporting large aircraft operations. However, both the 2002 Master Plan Update and 2005 Part 150 Noise Study focused primarily on general aviation development, including corporate and flight training operations, while also providing limited (<30 passenger charter) or on-demand



commercial passenger service. Therefore, it was recommended that “all of the airport runways be designed and maintained to ARC C-III level except the future Runway 10L-28R, which will be designed and maintained to B-II”.²²

Table 5-3 identifies recommendations provided in the 1993 and 2002 Master Plan Updates. Projects that are already completed or are currently within the Airport’s FDOT Joint Automated Capital Improvement Program (2008-2014) to be completed in the next five years are designated in bold text.

TABLE 5-3 PREVIOUS AIRPORT DEVELOPMENT RECOMMENDATIONS		
	1993 MPU	2002 MPU
Short-Term Development:	(1991-1995)	(2002-2006)
Airfield Pavement, Markings and Related Lighting Projects	<ul style="list-style-type: none"> • Runway 14 Extension north 450' • Extend Taxiway B • Overlay Taxiway A & Entrance/Exit Connectors² • New Access Taxiway (A-2) to Rwy 28L and Taxiway AA • FBO Access Taxiways (2) • Construct Taxiway B-2 • Overlay Taxiway F • Overlay Runway 10R-28L² • Construct Taxiway between Runway 10L and 14 • Construct Taxiway A-3 • Construct GA Apron Northwest of Taxiway F • New 3,700' x 100' Parallel Runway 10L/28R (10L/28R)¹ • Construct 3,700' x 50' Parallel Taxiway to Runway 10L-28R¹ • Construct connecting North-South Taxiway (3,675' x 50')² • Construct GA Apron Southwest of Runway 32 • Passenger Terminal Apron w/Connector Taxiways • Cargo Terminal Apron and Access Taxiway • Construct GA Apron North of Fairgrounds 	<ul style="list-style-type: none"> • Construct, Mark and Light Taxiway A-6 & E • Rehabilitate & Mark Taxiway A² • Construct 3,700 ft parallel runway (Rwy 10L-28R)¹ • Construct Parallel Taxiway to new runway (10L-28R)¹ • Construct connector taxiway between main airfield and new runway (10L-28R)² • Rehabilitate Apron Pavement
Visual, Navigational Aids & Airfield	<ul style="list-style-type: none"> • TVOR/DME • Install VASIs/PAPIs (Rwys 14 & 32) • Airport Beacon and ATCT Rehabilitation 	<ul style="list-style-type: none"> • REILs Runways 10L, 28R & 32² • STARS-LITE Display System (ATCT Safety Enhancement)

²² St. Lucie County International Airport Master Plan Update, 2002, *Airport Alternatives*, Hoyle, Tanner & Associates, Inc. pg. 4-1.

TABLE 5-3 PREVIOUS AIRPORT DEVELOPMENT RECOMMENDATIONS		
Lighting independent of pavement improvements	<ul style="list-style-type: none"> • Radio Lighting Controls (Rwys 10L-28R & 14-32)¹ • REILs Runways 10L, 28R & 32² • Upgrade Rwy 10L-28R to HIRL • Approach Lights (MALS) to Runway 10L • RVR Runway 10R 	<ul style="list-style-type: none"> • Install Approach Slope indicator Runway 10L-28R (PAPI/VASI/REILS/ALS, Etc.)²
Support Facilities	<ul style="list-style-type: none"> • Airport Maintenance Building¹ • Fencing (38,000 LF) – Phase 1 • ARFF Truck¹ • Construct ARFF Building • Fencing (27,700 LF) – Phase 2 • Fencing (38,000 LF) – Phase 3 	<ul style="list-style-type: none"> • No Additional Facilities Identified
Passenger and Cargo Facilities	<ul style="list-style-type: none"> • New Passenger Terminal Building Design² • New Passenger Terminal with FIS/CBP (15,000 SF)² • Construct New Cargo Terminal (10,000 SF) 	<ul style="list-style-type: none"> • No Additional Facilities Identified
Other Development Projects	<ul style="list-style-type: none"> • Improve Airfield Drainage Structures • Rehabilitate Airport Drainage² • Reconstruct Entrance Road • Update Exhibit “A” Property Map • Update Master Drainage Plan • Construct Road through or around Fairgrounds to “Curtis King Blvd” • Taylor Dairy Road Power Lines Burial or Re-routing to North Kings Highway¹ 	<ul style="list-style-type: none"> • Improve Airfield Drainage¹ • Conduct Part 150 Noise Study¹
Land Acquisition/ Reimbursement	<ul style="list-style-type: none"> • Property Adjacent to Runway 10L-28R (Parcel 53)^{1 & 2} • Acquire Property for Ultimate Terminal Development 	<ul style="list-style-type: none"> • Acquire land or easement for approaches and development.
Intermediate Term Development	(1996-2000)	(2007-2011)
Airfield Pavement, Markings and Related Lighting Projects	<ul style="list-style-type: none"> • Construct GA Apron Southwest of Taxiway F end 	<ul style="list-style-type: none"> • Pavement Rehabilitation Runway 14-32¹, Taxiways A, C and E² • Construct GA Apron NW of Taxiway B • Construct GA Apron NW of Taxiway F • Construct Terminal Apron • Construct Aircraft Run-up areas¹ • Extend/Widen/Strengthen Taxiway A²
Visual,	<ul style="list-style-type: none"> • No Additional Facilities Identified 	<ul style="list-style-type: none"> • Upgrade Runway 10R-28L lighting



**TABLE 5-3
PREVIOUS AIRPORT DEVELOPMENT RECOMMENDATIONS**

<p>Navigation Aids & Airfield Lighting independent of pavement improvements</p>		<p>to HIRLs</p>
<p>Support Facilities</p>	<ul style="list-style-type: none"> • No Additional Facilities Identified 	<ul style="list-style-type: none"> • Construct ARFF Facilities¹ • Acquire ARFF Vehicle¹ • Install Perimeter Safety Fencing - Phases III-VIII² • Construct Perimeter Road • Install security/perimeter fencing¹ • Upgrade electrical vault¹ • Airport Industrial Park North – Infrastructure Improvements • Demolition of airport owned structures
<p>Passenger and Cargo Facilities</p>	<ul style="list-style-type: none"> • No Additional Facilities Identified 	<ul style="list-style-type: none"> • Construct Passenger Terminal
<p>Other Development Projects</p>	<ul style="list-style-type: none"> • No Additional Facilities Identified 	<ul style="list-style-type: none"> • Airport Master Plan Update¹ • FBOs planning to add T-Hangars, Conventional Hangars and fuel farm capacity – airport provide associated taxi lanes, utilities and roadways needed. • Industrial Park Development (Phases I & II)¹ • Airport Drainage Improvements¹
<p>Land Acquisition/Reimbursement</p>	<ul style="list-style-type: none"> • No Additional Facilities Identified 	<ul style="list-style-type: none"> • Reimburse Airport Land – Phase I
<p>Long-Term Development:</p>	<p>(2000-2010)</p>	<p>(2012-2020)</p>
<p>Airfield Pavement, Markings and Related Lighting Projects</p>	<ul style="list-style-type: none"> • Construct GA Apron Northeast of Taxiway B • Construct Second Connecting North South Taxiway 	<ul style="list-style-type: none"> • 450 ft extension of Runway 14 • General Aviation Ramp Improvements
<p>Visual, Navigation Aids & Airfield Lighting independent of pavement improvements</p>	<ul style="list-style-type: none"> • No Additional Facilities Identified 	<ul style="list-style-type: none"> • No Additional Facilities Identified
<p>Support Facilities</p>	<ul style="list-style-type: none"> • No Additional Facilities Identified 	<ul style="list-style-type: none"> • Airport Electrical Improvements



TABLE 5-3 PREVIOUS AIRPORT DEVELOPMENT RECOMMENDATIONS		
Passenger and Cargo Facilities	<ul style="list-style-type: none"> No Additional Facilities Identified 	<ul style="list-style-type: none"> No Additional Facilities Identified
Other Development Projects	<ul style="list-style-type: none"> No Additional Facilities Identified 	<ul style="list-style-type: none"> Improve Airfield Drainage Airport Master Plan Update
Beyond Twenty-Year Planning Period	Beyond 2011	Beyond 2020
Airfield Pavement, Markings and Related Lighting Projects	<ul style="list-style-type: none"> Extend Runway 10R-28L to 10,000' x 150' Extend Runway 10L-28R to 8,000' x 150' MALSR Runway 10R and 10L Construct Partial North Parallel Taxiway to Rwy 10L/28R Extend South Parallel Taxiway Rwy 10L-28R Construct North Parallel Taxiway to Runway 10R-28L Construct Taxiways within Industrial Park 	<ul style="list-style-type: none"> No Additional Facilities Identified
Visual, Navigational Aids & Airfield Lighting independent of pavement improvements	<ul style="list-style-type: none"> Relocate Air Traffic Control Tower Relocate Airport Beacon 	<ul style="list-style-type: none"> No Additional Facilities Identified
Support Facilities	<ul style="list-style-type: none"> No Additional Facilities Identified 	<ul style="list-style-type: none"> No Additional Facilities Identified
Passenger and Cargo Facilities	<ul style="list-style-type: none"> Reserve Property for Future Development 	<ul style="list-style-type: none"> No Additional Facilities Identified
Other Development Projects	<ul style="list-style-type: none"> Construct internal access roads related to Northern Industrial Development 	<ul style="list-style-type: none"> No Additional Facilities Identified
Land Acquisition	<ul style="list-style-type: none"> Acquire property within Runway 32 RPZ Acquire Former City Landfill Property Acquire Runway 10R and 10L Property within Approach Zones (Property between Seminole Blvd and Taylor Dairy Road) Acquire Northern Parcels 25, 59A, 40, 41 and 42 along the west side of the airfield property Acquire Parcel 65 east of North Kings Highway and south of airport Commerce Park. 	<ul style="list-style-type: none"> No Additional Facilities Identified
<p>Notes:</p> <p>¹Project Completed</p> <p>²Project included in 2009-2015 FDOT Joint Automated Capital Improvement Program</p> <p>Sources: 1993 Master Plan Update, Greiner Inc., 2002 Master Plan Update, Hoyle, Tanner & Associates, Inc., St. Lucie County International Airport Joint Automated Capital Improvement Program 2008-2015, and The LPA Group Incorporated</p>		



5.4.5 Pavement Strength Requirements

An important feature of airfield pavement is the ability to withstand repeated use by aircraft of significant weight. Airport pavement strength was discussed in detail in **Section 4.5.2, Runway Pavement Maintenance and Strength Analysis**, within **Chapter 4** of this report. At FPR, the fleet mix includes small single-engine training aircraft and large corporate aircraft with operating weights exceeding 60,000 pounds. According to FAA 5010 data, Runway 10R-28L has a single-wheel strength of 30,000 pounds and dual wheel strength of 60,000 pounds. Runway 14-32 has a published strength of 15,000 pound single wheel.

However based upon historic research, it appears that there may be two types of pavement under Runway 14-32 which may make the pavement strength greater than what is currently published (15,000 lbs single wheel). As a result of the following information, a project to test weight bearing capacities is recommended.

- Prior to World War II, Runway 14-32 was originally 4000 x 100 feet. The runway composition was 6 inches of sand asphalt with a surface course of asphaltic concrete and a load bear capacity of 15,000 pounds single-gear. This was based on a 1977 FDOT Pavement Evaluation Study.
- During WWII, the runway was lengthened to 5000 and widened to 200 feet. The new pavement consisted of a stabilized 6-inch sub base, a 6-inch lime rock base, and a 1 ½ inch asphaltic concrete surface course. The new pavements had a load bearing capacity of 30,000 pounds single-gear. However, the center portions were not strengthened and retained their 15,000 single-gear weight bearing capacity. According to the documents, an additional 1 inch of bituminous surface was added in 1971 to the south one-half of the runway. It also appears that the additional 1000 foot section that was added was designed and constructed using the same weights for Runway 9-27 which was 30,000 pound single wheel and 60,000 pound dual wheel configurations.
- In 1984, Runway 14-32 was overlaid and remarked. It appears that the center 100 feet was overlaid in accordance with the airport layout plan (ALP) at that time. That report stated that the original 100 feet of Runway 14-32 was Type-1 pavement, 15,000 pound single-gear. The additional pavement that was widened was Type-2, 30,000 pound single wheel configuration.
- In the 1984 Greiner Engineering Report under pavement design stated that an overlay design of 30,000 pounds was used and was consistent with criteria provided under the 1984 Plan and ALP. However, the master plan stated that “the existing bituminous



treated sand base course material was assigned a small value when evaluating the existing strength”, and that a 2-inch bituminous overlay was recommended to provide strength for up to 30,000 pounds. It also stated that extensive field exploration and testing of existing pavement would be required prior to strengthening the runway. Also listed in the 1984 engineering report is FAA Form 5100-1 (Airport Pavement Design) which shows a 30,000 pound single wheel configuration.

- In 2003-2004, Runway 14-32 had another overlay done. In the Tetra Tech Wildlife Heritage Service (WHS) report, it states that the 1984 project resulted in a 3-inch overlay that was placed over the center 100 feet of the runway.
- The 2003 report stated that the design weight of 15,000 pound single-wheel was used, as specified in the 2002 Master Plan Update. When looking at the FAA Form 5100-1 for 2003, the form shows 15,000 pound single wheel and that 1 ½ inches was milled and 2 inches of bituminous surface was added. It appears the whole runway was done. However, in the Final Engineering report, it stated that the design mix was for aircraft less than 60,000 pounds.
- Finally, it appears that during the project, a Petromat®²³ was discovered approximately 2 inch down from the surface, and that the milling was adjusted to one-inch and crack sealing was done.²⁴

According to the **FAA Southern Region Guidance Letter**, dated May 2001, entitled, *Runway Length and Strength Requirements for Business Jet Aircraft (Appendix E)* the runway pavement strength should be based upon aircraft with the most demanding maximum takeoff weight (MTOW) utilizing the airport on a regular basis (approximately 500 operations). "In general, runways should have dual wheel pavement strength of 30,000 pounds if they accommodate only category B business jets, 60,000 pounds if they accommodate category B and C business jets, and 90,000 pounds if they accommodate category B, C, and D business jets."²⁵

²³ Petromat® is a type of non-porous fabric saturated with an asphalt cement tack coat to provide a continuous moisture and stress barrier to prevent water infiltration from the pavement surface into the base course.

²⁴ Historic airport pavement documentation, airport records and previous master plan pavement information.

²⁵ Runway Length and Strength Requirements for Business Jet Aircraft, FAA Southern Region Regional Guidance Letter, May 2001.



However, the theory behind FAA pavement design has changed in the last year, where pavement was originally designed for a specific aircraft it is now designed based on current and future fleet mixes. The FAA currently has a Draft Advisory Circular (AC 150/5335-5B, *Standardized Method of Reporting Airport Pavement Strength – PCN*) that will require all airports servicing aircrafts with gross weight greater than 25,000 pounds report a Pavement Classification Number (PCN) within 3 years of the effective AC date. PCN is a number that expresses the load-carrying capacity of a pavement for unrestricted use. The current airport PCN will be determined using the FAA’s COMFAA program. The PCN will be evaluated against current and future aircraft operations to determine if deficiencies exist. If an insufficient pavement section is found, then a pavement design must be completed to change the airport PCN.

5.4.6 Minimum Requirements for FAR Part 139 Certification

In order to accommodate FAR Part 121 Certificate, *Air Carrier Commercial Operations*, and *Unscheduled Large Air Carrier Aircraft (30+ Seats)* operating under FAR Part 135 Certificate, *On-Demand Commuter and Air Taxi Services*, an airport must obtain its FAR Part 139 Certification. The purpose of FAR Part 139 is to ensure the safety of air transportation by detailing airport operational and facility requirements needed to safely accommodate commercial operations. There are four classes of Part 139 Certification:

TABLE 5-4 FAR PART 139 AIRPORT CLASSES				
Type of Air Carrier Operation	Class I	Class II	Class III	Class IV
Scheduled Large Air Carrier Aircraft (30+ Seats)	X			
Unscheduled Large Air Carrier Aircraft ¹ (30+ Seats)	X	X		X
Scheduled Small Air Carrier Aircraft (10-30 Seats)	X	X	X	

Notes:
¹Includes Public Charters Certified under 14 CFR Part 380
 Source: Federal Aviation Administration, Part 139 Certification, Classes of Airports

“It is important to note that airport operators do not need a Part 139 Airport Operating Certificate (AOC) to serve air carrier operations not described in **Table 5-4**. Further, an airport certified under Part 139, a certificate holder may not have to comply with some Part 139 requirements during air carrier operations not covered by Part 139.”²⁶

All FAR Part 139 Airports must have and maintain an airport certification manual which includes facility inspection, training and airport operating requirements as well as an airport

²⁶ Federal Aviation Administration, FAR Part 139 Certification and Classes of Airports (http://www.faa.gov/airports/airport_safety/part139_cert/?p1=classes)



emergency manual (*AC 150/5200-31A*), wildlife hazard management manual, *Navigational Aids, Marking and Signage Plan*, and security requirements. In addition, the airport must be equipped with airport rescue and fire fighting facilities and personnel based upon the type and level of demand as well as pass an annual Airport Inspection by FAA. Further, as a result of the September 11, 2001 Terrorist Attacks and the creation of the Department of Homeland Security, commercial airports must also meet the requirements outline in **49 CFR Part 1542 – Airport Security**.

There are five levels of Airport Rescue and Firefighting requirements as shown in **Table 5-5** and as discussed in Section 4.7.3 of the previous chapter.

TABLE 5-5 ARFF INDEX DETERMINATION		
ARFF Index	Air Carrier Aircraft Length	Sample Commercial Aircraft
Index A	< 90 Feet	Q300 Turboprop, ERJ 135
Index B	≥90 Feet <126 Feet	Embraer 175, Boeing 737-700
Index C	≥126 Feet <159 Feet	Boeing 737-800, Airbus A321-200
Index D	≥159 Feet <200 Feet	Boeing 767-300ER, Airbus A300-600
Index E	>200 Feet	Boeing 747-400, Airbus A380-800

Source: FAR Part 139, The LPA Group Incorporated, 2009.

The ARFF requirements (*AC 150/5210-6D*) are contingent upon the largest air carrier aircraft operating at the airport (in terms of length and wingspan) with at least five average daily departures. FPR, although not currently certified as a Part 139 Airport, is equipped with on-airport ARFF facilities that meet the Index A requirements. Based upon limited discussions concerning potential commercial service at FPR, it is anticipated that an ARFF Index of A can accommodate commercial demand requirements.

Airports within the same Aircraft Class can range in size, facilities and operations based upon operator requirements and passenger demand. A sample of Part 139 airports is provided in **Table 5-6**.



TABLE 5-6 A SAMPLE OF PART 139 AIRPORTS		
Airport Name	CFR Part 139 Certification	ARFF Index
Fort Lauderdale/Hollywood International	I	E
West Palm Beach International	I	D
Charlotte County Airport	I	A
St. Augustine/St. Johns County Airport	I	A
Athens/Ben Epps Airport, GA	II	A
Four Corners Regional Airport, NM	III	A
Lakeland Linder Regional Airport	IV	A
Vero Beach Municipal Airport	IV	A
Federal Aviation Administration Database, October 2009		

However, there are several basic steps an airport must go through in order to obtain its Airport Operating Certificate:

- **Step 1: Determine Type of Commercial Service** - An airport operator must provide written documentation to the local Regional Airports Division that either the airport has air carrier service or will have air carrier service by a certain date. Without air carrier service this regulation does not apply unless you currently have an AOC or limited airport operating certificate and elect to retain that certificate.
- **Step 2: Determine Airport Class** - The Class of Airport (Class I-IV) needs to be determined based upon the type of air carrier service that exists or will exist at the airport.
- **Step 3: Submit Application** - Prepare and submit an application (FAA Form 5280-1) to the Regional Airports Division and provide two copies of the Airport Certification Manual (ACM) for inspection.
- **Step 4: Airport Certification Manual** - Prepare the Airport Certification Manual as required by §139.201. The ACM should be comprehensive enough to clearly explain to airport personnel what is required on a daily basis to comply with the regulation and as required under specific design Advisory Circulars and Airport CertAlerts. Instructions for completing the ACM are provided in AC150/5210-22.
- **Step 5: Inspection** - an initial inspection is required under section 139.305 and 49 USC 44706 (Airport Operating Certificates) to determine that the applicant is properly and adequately equipped and able to provide a safe airport operating environment. After initial certification, recurrent inspections will occur every 12 to 24 months at a minimum. Basic Phases of 14 CFR Part 139 Inspection include:
 1. Pre-inspection review of airport files and airport certification manual
 2. Administrative inspection of airport files, paperwork, etc. – includes updating of the Airport Master Record (FAA Form 5010), and review of the Airport



Certification Manual (ACM), Notices to Airmen (NOTAM), airfield self inspection forms, etc.

3. Movement area inspection – check the approach slopes of each runway end; inspect movement areas, to ascertain condition of pavement, markings, lighting, signs, abutting shoulders and safety areas; observe ground vehicle operations; ensure the public is protected against inadvertent entry and jet or propeller blast; check for the presence of any wildlife; check the traffic and wind direction indicators, etc.
 4. Aircraft rescue and fire fighting inspection – Conduct a timed response drill; review ARFF personnel training records including annual live fire drill and documentation of basic emergency medical care training; check equipment and protective clothing for operation, condition and availability.
 5. Fueling facilities inspection – Inspection of fuel farm and mobile fuelers; check airport files for documentation of their quarterly inspection of the fueling facility; review certification from each tenant fueling agent concerning completion of fire safety training.
 6. Night inspection – Conducted to evaluate runway/taxiway and apron lighting and signage, pavement markings, airport beacon, wind cone, lighting and obstruction lighting for compliance with FAR Part 139 and ACM; a night inspection shall be conducted if air carrier operations are conducted or expected to be conducted at an airport at night or the airport has an instrument approach.
 7. Post Inspection Briefing with Airport Management – Discuss findings; issue Letter of Correction noting violations and/or discrepancies if any are found; agree on a reasonable date for correction of violations and give safety recommendations.
- **Step 6: Issuance of Certification** – FAA Regional Airports Division issues certification to the airport once the airport operator passes inspection.²⁷

An airport may petition the FAA for an exemption from any requirement of Part 139 including Airport Rescue and Firefighting (ARFF). However, exemptions are time limited and normally do not exceed one year. Further, FAR Part 139 does not provide airport staffing requirements, but states that the airport must have adequate staff to accommodate operational demand while providing a safe operating environment²⁸. The only staffing requirements that FAR Part 139 requires is that one member of the ARFF staff must be trained to provide basic emergency medical care.

²⁷ Federal Aviation Administration FAR Part 139 List of Requirements

²⁸ Federal Aviation Administration Airport Certification Office – Atlanta GA, September 2009 and FAR Part 139.303



Since a forecast of commercial passenger demand was not developed as part of this master plan update and to date no Part 121 operator has provided a letter to the Board of County Commissioners, it is unknown what class of airport operations that FPR would be required to accommodate. Still in an effort to be proactive, a summary of minimum facility requirements compared to actual facilities at FPR was developed and illustrated in **Table 5-7**.

It is important to note that facility requirements are not only dependent upon FAA and TSA design and operating requirements but also the operating certificate requirements of the commercial carrier. A legacy carrier like Delta Airlines may require airports to provide certain facilities, whereas a smaller point to point carrier, such as Skybus or BahamasAir, may not require specific facilities. This can be seen when comparing facilities at several Class I airports in the state such as Charlotte County Airport and Ft. Lauderdale/Hollywood International Airport. Ft. Lauderdale has significantly more traffic and primarily caters to the legacy operators (i.e. Delta Airways, Southwest, US Air, etc.), whereas passenger demand at Charlotte County Airport is much less and the airport is served by smaller point to point operators such as Allegiant Airways. Both airports provide commercial service, but support different Part 121 operators with different requirements.

Still based upon existing facilities and likely demand²⁹, it is anticipated that the airport would be initially certified under Class I (unscheduled and scheduled large (>30 passenger seats) and scheduled small commercial aircraft operations). Based upon this criterion, facilities and documentation required are outlined in **Table 5-7**.

TABLE 5-7 MINIMUM COMMERCIAL SERVICE REQUIREMENTS	
Class I Requirements	St. Lucie County International Airport
Airport Certification Manual (AC 150/5210-21)	In Progress
ARFF Facilities, equipment and Personnel	Yes – Index A
Medical Services	Yes – part of ARFF
Pavement Maintenance (AC 150/5380-6 and AC 150/5390-7)	Pavement Maintenance and Overlay of Runway 10R-28L in progress
Safety Area Requirements (AC 150/5300-13)	Meets criteria
Airport Markings (AC 150/5340-1)	
Runway Approach Markings	Meets both precision and non-precision requirements
Runway Centerline and Edge Markings	Yes

²⁹ The St. Lucie County Tourism Board is actively pursuing commercial service to and from the Bahamas. Considering the current fleet of the national carrier, BahamasAir, which includes the DH-8 Q-300 (50 passenger seats) and Boeing 737-300/400 (162-189 passenger seats), FPR would support large scheduled and unscheduled operations (FAR Part 139 Class I)



TABLE 5-7 MINIMUM COMMERCIAL SERVICE REQUIREMENTS	
Class I Requirements	St. Lucie County International Airport
Holding Position Markings	Yes
Taxiway Centerline and Edge Markings	Yes
ILS Critical Area Markings	Yes
Precision Obstacle Free Zone	Will be added as future requirements dictate
Airport Signage (AC150/5340-18 & AC 150/5345-44F)	
Internally Illuminated Taxiway Identification Signs	Yes
Internally Illuminated holding position signs	Yes
Internally illuminated Instrument Landing System critical area	Yes
Airport Lighting (AC 150/5300-13, 5340-24, 21 & 23B, 5000-30, etc.)	
Runway Lighting equivalent to takeoff and landing minimum requirements	Yes – Medium Intensity Runway Lighting
One taxiway lighting system	Yes
Airport beacon	Yes
Approach lighting that meets takeoff and landing requirements	Runway 10R has REILs and VASI. Recommend upgrading to ODALS or MALS per AC 150/5300-13
Obstruction marking and lighting (AC 150/5340-24)	Yes
Miscellaneous Lighting Visual Aids (AC 150/5340-21) and includes apron, buildings, fuel farm, roads, etc.	Apron, Building and Parking Lots have lighting
Airport Winter Safety Operations (AC 150/5000-30)	Not Applicable
Lighted wind cone and supplemental wind cones visible to pilots during final approach and prior to takeoff (AC 150/5340-23B)	Yes
Lighted segmented circle, landing strip indicator and traffic pattern indicator (AC 150/5340-5B)	Yes, the airport is equipped with a lighted segmented circle. Relocation or an additional segmented circle is recommended associated with the new runway, 10L-28R
Airport Emergency Plan (AC 150/5200-31A)	Development of the Airport Emergency Plan is currently in progress
Security Fencing	Additional security fencing has been added, and additional fencing is planned to limit unauthorized access to the airfield.
Aircraft Movement and Parking Areas (14 CFR Part 139)	
Passenger Loading/Unloading Aircraft Parking Areas	The Airport is equipped with a terminal apron. Security and operational requirements are being addressed as part of the Terminal Design
Passenger Aircraft Overnight Parking Areas	The existing terminal apron and adjacent apron areas could easily accommodate overnight parking requirements if needed.
General Aviation Parking Area	The airport is equipped with sufficient general aviation



TABLE 5-7 MINIMUM COMMERCIAL SERVICE REQUIREMENTS	
Class I Requirements	St. Lucie County International Airport
	parking facilities to accommodate forecast demand. In addition, both Key Air and APP Jet Center of Ft. Pierce have plans to expand their facilities to accommodate additional corporate demand.
Isolated/Security Parking Position	The airport is equipped with more than 165,000 SY of available apron space. There is currently a holding pad located adjacent to Taxiway E on the Northeast side of the airfield near the ARFF facilities. This area would provide an ideal location for a secure parking position in a case of terrorism or other criminal activity.
Airside Roads – should provide clear view of fencing and are to be used for maintenance, emergency personnel and security patrols	FPR is equipped with some internal perimeter roads. In conjunction with the airport operating area and development, expansion of the internal perimeter road is recommended
Airport Terminal Facilities AC 150/5360-13, Terminal Requirements, Transportation Security Administration Requirements, etc	
Holding Room	This is being addressed as part of the Airport Terminal Design Requirements
Passenger Security Checkpoint	This is being addressed as part of the Airport Terminal Design Requirements
Baggage Security Checkpoint	This is being addressed as part of the Airport Terminal Design Requirements
TSA Offices	This is being addressed as part of the Airport Terminal Design Requirements
Law Enforcement Facilities	This is being addressed as part of the Airport Terminal Design Requirements
US Customs and Border Protection (Airport Technical Design Standards for Passenger Processing Facilities, August 2006)	
US Customs Minimum Space Facilities – Small Airport = 15,412 SF	Current Facilities = 8,000+ feet; Will need to be expanded to accommodate requirements
<i>Sources: Federal Aviation Administration Part 139 Certification Requirements, FAA Advisory Circulars, TSA 1542, Airport Security Requirements, US Customs and Border Protection Requirements, 49 CFR 1540, 1542, 1544, 1546, & 1548, and The LPA Group Incorporated, 2009</i>	

Through discussions with airport management and review of the airfield, the majority of facilities are currently in place for St. Lucie County International Airport to support Class I commercial airport operations. However, in order to clear international passengers, US Customs and Border Protection Facilities will need to be expanded based upon the requirements outlined in **Chapter 4** unless passengers are pre-cleared prior to bordering the aircraft.



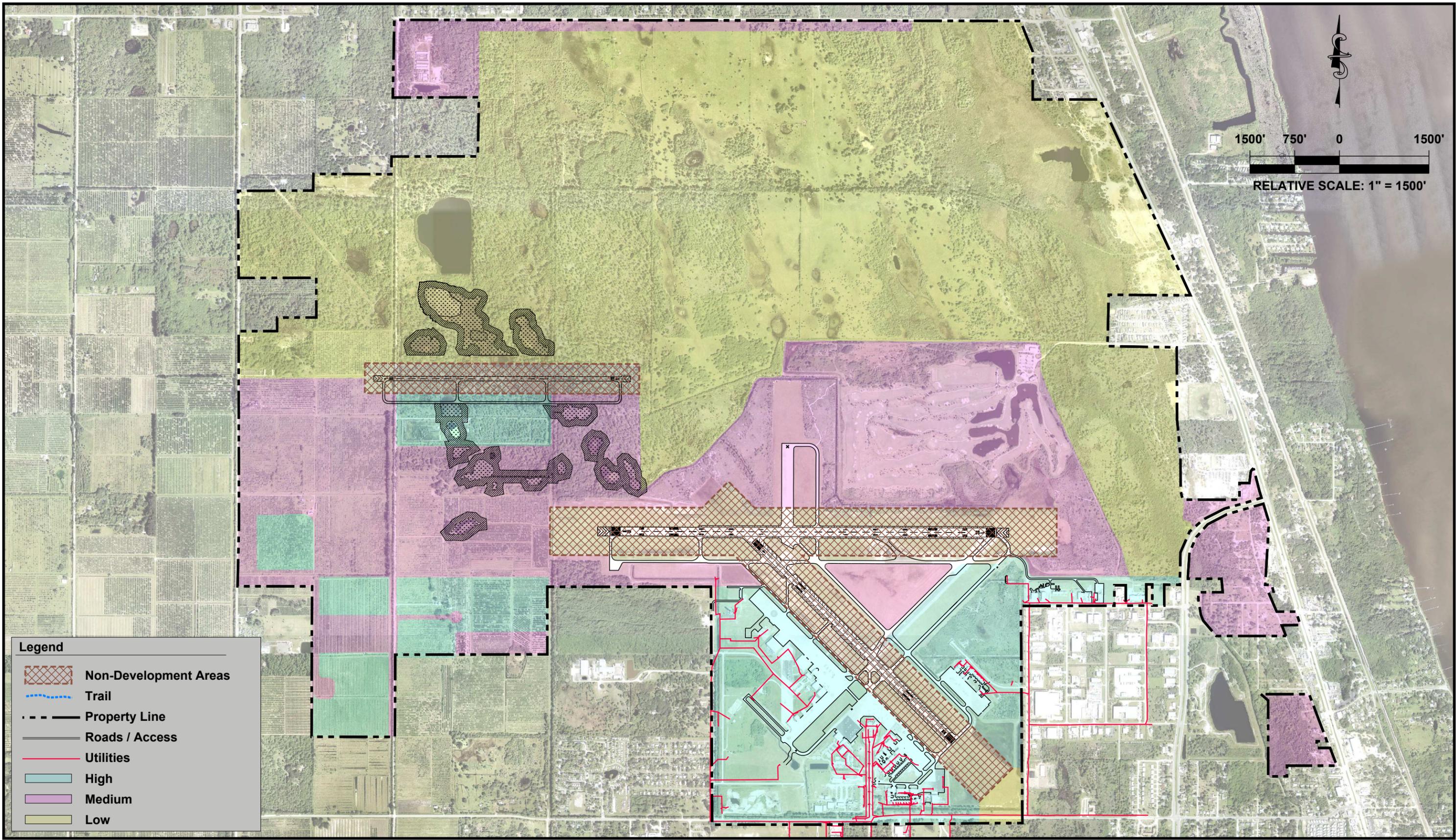
Additional operational requirements including personnel training, criminal history checks and record keeping, badging, etc will be required in conjunction with the implementation of commercial service as designated by 49 CFR 1540, 1542, 1544, 1546 and 1548. At the time of this writing, FPR Management is working with TSA to determine the minimum requirements needed to accommodate the potential for limited (i.e. unscheduled large or small scheduled) commercial aircraft operations.

These facilities represent the minimum requirements associated with commercial airport development. As such, recommendations will be incorporated into any alternative scenario in support of commercial operations at St. Lucie County International Airport within and beyond the twenty-year planning period.

5.5 Airport Development Zones

According to existing and future St. Lucie County Land Use Zoning, portions of the airport are designated as facilities/public use, utility, conservation or mixed use. Further, the current Comprehensive Plan designates property surrounding the airport as “specific use” thereby limiting development to commercial and industrial businesses. Thus prior to the alternative evaluation, it was important to identify developable tracts of land that currently reside on airport property. Many factors contribute to a land’s development including: potential wetland impacts, distance to utilities, grading requirements, vehicular access, compatible zoning, and proximity to runways and taxiways. Based on these factors, the entire airport property was scrutinized collectively and then divided into zones of development. Each zone was then identified as high, medium or low priority.

Tracts that were ideally situated due to vehicular access, minimal grade requirements, proximity to utilities, and that had airfield access were identified as a high priority development zone. Those that had more than one deficiency such as lack of vehicular access and utility access were denoted as a low priority development zone. Tracts that lacked only one desirable feature were designated as a medium priority development zone. Tracts that did not meet any of the desirable development criteria were not identified since these areas should only be developed only after existing development options have been exhausted. Areas marked with a cross-hatch illustrate airfield safety areas, building restriction areas, and other non development zones on the airport. **Figure 5-7** graphically illustrates the various potential development zones on airport property.



St. Lucie County -
International Airport
Master Plan Update

Airport Development Zones

DATE
06/07/2010

5-7

FIGURE NO.



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5.6 Sustainability Options

St. Lucie County is actively pursuing sustainable development opportunities, and has created a Sustainability Advisory Ad Hoc Committee to address a variety of issues including green building initiatives, green job development, water quality and conservation, waste reduction, eco-industrial development,³⁰ etc. Currently the Environmental Resource Department is in the process of developing a Sustainability Action Plan for the County.

Also, according to the 2008 St. Lucie County Evaluation and Appraisal Report, the County is interested in incorporating “green” building standards in their Comprehensive Plan and Land Development Code. “Green building can be defined as the practice of 1) increasing the efficiency with which buildings and their sites use energy, water, and materials, and 2) reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal. “Green” or “sustainable” design create healthier work, learning, and living environments, with more natural light and cleaner air, and contribute to improved employee and student health, comfort, and productivity. Sustainable buildings are cost-effective, saving money by reducing operations and maintenance costs by lowering energy, waste disposal, and water, environmental and emissions costs. Although initially sustainable buildings incur a higher “up-front” cost compared with standard construction, they provide an array of environmental and financial premiums which in the long-term provide substantial savings which may mitigate the initial costs.”³¹

Some recommended sustainable development options which may be applied to the airport include:

- Rainwater Reclamation
- Green Terminal Building Development
- Bio-diesel fuel for ground equipment
- Upgrade to LED lighting (airfield taxiway lighting already upgraded)
- Installation/implementation of alternative power generation to either supplement or back-up existing power sources (i.e. solar, wind, geothermal, etc.)
- Xeriscaping³² and composting
- Solid waste reduction and recycling
- Light pollution reduction

³⁰ Eco-Industrial Parks are based upon the idea that the byproducts of one business could be used as a base ingredient for the development of another product; thereby resulting in a significant decrease in production waste and transportation costs.

³¹ St. Lucie County Evaluation and Appraisal Report, 2008, *A.3-Incorporation of Green Building Standards*

³² Xeriscape landscaping or xerigardening consists of using native plants and other materials which reduce or eliminate the need for supplemental irrigation.



- Improvement of indoor air quality and use of natural light (i.e. skylights, windows, light refracting tubes, etc.)
- Collection of recyclables and use of regional services
- Encourage green space, walk and bike paths, and other development within industrial commercial air parks, etc.

There are a number of sustainable practices that can be initiated at FPR that are simple, free/low-cost and low-tech (changing light bulbs to CFL or LED, using rain barrels to reclaim water, turning off lights when not in use, etc.) as well as more high-tech and cost intensive projects (i.e. green building development, solar panels, etc.). A number of airports with the assistance of the Airports Council International and local consultants are incorporating sustainable principles as part of airport development as well as within the capital improvement program. While it is important that planners and designers consider sustainable building and development practices, development must coordinate with other best management practices such as impacts to operations, safety, life cycle costs, etc.

5.7 Alternative Development Options

FPR is equipped with three strips of runway pavement, Runway 10R-28L, Runway 14-32 and Runway 10L-28R. Runway 10R-28L, the primary runway, has published dimensions of 150 feet x 6,492 feet of which only 5,000 feet of the runway has 25 foot paved shoulders. Runway 14-32 has a published width and length of 100 x 4755 feet with 50 foot wide paved shoulders, and the recently completed³³ training Runway 10L-28R is 75 ft x 4,000 ft. If the cost of airfield improvements, maintenance, noise and other environmental impacts were not limiting, the number of potential alternatives would be limitless.

Based upon previous recommendations, FPR has requested both FAA and FDOT eligible funding using grant requests through the FDOT's Joint Automated Capital Improvement Program (JACIP). The JACIP is used by FDOT and airports to identify priority projects and funding over a ten-year planning period. Funding associated with projects within the first three years of the program is locked, and no new projects can be added unless determined to be required for safety. Even then, the project may still not receive FDOT or FAA grant funding.

Near term projects (2009-2011) within the FPR JACIP are listed in **Table 5-8**. Projects either or currently in-progress were identified as such. Projects within the outer years, however, may be moved since funding is not locked, but is dependent upon priority needs within the aviation system. Based upon the airport's long-term role and proposed development, the need

³³ The new training runway was open for use as of September 17, 2009.



and scope of these outer year projects were appraised and incorporated into the proposed development options.

TABLE 5-8 ST. LUCIE COUNTY JOINT AUTOMATED CAPITAL IMPROVEMENT PROGRAM 2008-2011	
Year	Projects
2009	<ul style="list-style-type: none"> • Environmental Mitigation² • Update Airport Master Plan² • Florida Power & Light Utility Relocation¹ • Update Master Drainage Plan² • Acquire 29 acres south of Runway 10L/28R¹ • Airfield Fencing Obstruction Lights¹ • Upgrade Lighting and Signage¹ • Terminal Building Improvements²
2010	<ul style="list-style-type: none"> • Rehabilitate Taxiway C & Connectors • Design & Rehabilitation Runway 10R-28L¹ • Florida Power & Light Utility Relocation¹ • Rehabilitate Taxiways A, B and Connectors • Install Perimeter Fencing (GA Entitlements) • Conduct Part 150 Noise Compatibility Study • Storm water Pollution Prevention Plan Update
2011	<ul style="list-style-type: none"> • Construct Terminal Surface Parking • Construct & Rehabilitate Apron • Design/Construct New Customs and Terminal Facility • Wetland & Protected Species Enhancement Plan Implementation
<p><i>Notes:</i> ¹ Project Completed as of February 2010 ² Project in progress as of February 2010 Source: St. Lucie County International Airport Joint Automated Capital Improvement Program Work Program, 2008-2015</p>	

Since a master plan is a requirement of the airport’s grant assurances and is a document used to identify projects for future funding, a number of alternative options within and beyond the twenty year planning period were developed to accommodate airside, terminal and landside requirements. Although a number of alternative options could be considered, options were limited to alternative scenarios that could accommodate forecast demand as well as meet the goals and objectives of both the airport operator and users were considered. These alternatives were provided to the Technical Advisory Committee³⁴, Tenants, the Community and Board of

³⁴ Meeting held on October 14, 2009. Recommended development was determined based upon 100 percent approval of attending TAC members (13 of 15 members).



County Commissioners³⁵ to stimulate discussion and obtain support/approval for long-term aviation development at St. Lucie County Airport within and beyond the twenty-year planning period. It is important to note that master plans are typically updated every ten years to accommodate changes in both the local, regional and national demand, technology and community requirements. Information from these meetings provided the basis for the recommended development scenario illustrated in **Sections 5.9** and **5.10** of this report which were presented to the Board of County Commissioners in early December 2009 and approved during a public workshop held on February 1, 2010.

5.7.1 No Build

Despite existing deficiencies and potential demand identified in earlier chapters of this report, one option that the airport may want to consider is a No Build or maintenance only approach. This option does not resolve previously identified deficiencies and will not accommodate forecast demand; however, this is the lowest cost alternative since airport expenditures will be limited to the replacement of existing facilities after they have exceeded their useful life or to simply maintain existing facilities. This approach would limit potential growth and may negatively affect the forecasts of operational activity causing operations and based aircraft demand to decrease.

5.7.2 Runway Alternatives

As identified in **Chapter 4, Demand Capacity and Facility Requirements**, long-term facility requirements were identified. At the request of BOCC and Technical Advisory Committee, the practicality of FPR accommodating limited commercial/commuter and air carrier passenger service was also considered. Using the requirements identified in **Chapter 4**, runway alternatives were evaluated based upon the existing and potential future airport role, fleet mix and critical aircraft.

Runway 14-32

The 1993 and 2002 Master Plan Updates both recommend an extension of Runway 14 to the northwest. Although differing in the length of the proposed extension, 624 feet and 850 feet, respectively, both reports stated that the extension to the northwest would enhance airfield capacity and safety by providing a takeoff holding area outside the safety area of Runway 10R-28L. In addition, although not currently designated as a secondary primary runway³⁶ because

³⁵ Public Meeting was held on October 15, 2009; Informal Workshop was held with St. Lucie County Board of County Commissioners on December 7, 2009, and final approval was obtained during BOCC Public Workshop held on February 1, 2010.

³⁶ A secondary primary runway provides 95% or greater wind coverage and should be designed to a length equal to the primary runway or the length required to accommodate the critical aircraft likely to use that



of length (4,755 feet) and load bearing capacity (15,000 single-wheel), it was recommended that Runway 14-32 meet the 80 percent capacity criteria of Runway 10R-28L allowing it to support existing and future capacity needs at FPR.

In reviewing runway length and strength requirements for Runway 14-32 based upon the current and anticipated fleet mix, a runway extension of 945 feet was recommended as illustrated in **Figure 5-8**.

This would provide a total length of approximately 5,700 feet. While the runway length evaluation based upon the criteria outlined in AC 150/5325-4B, Table 3-1 and Figure 3-1, shows a runway length requirement at a 60 percent load factor of 5,500 feet, this would not eliminate the Runway 14 threshold from being within the safety area of Runway 10R-28L. Thus, it is the recommendation of this master plan that Runway 14 be extended by 945 feet to remove the takeoff holding area from within the object free area of Runway 10R-28L.

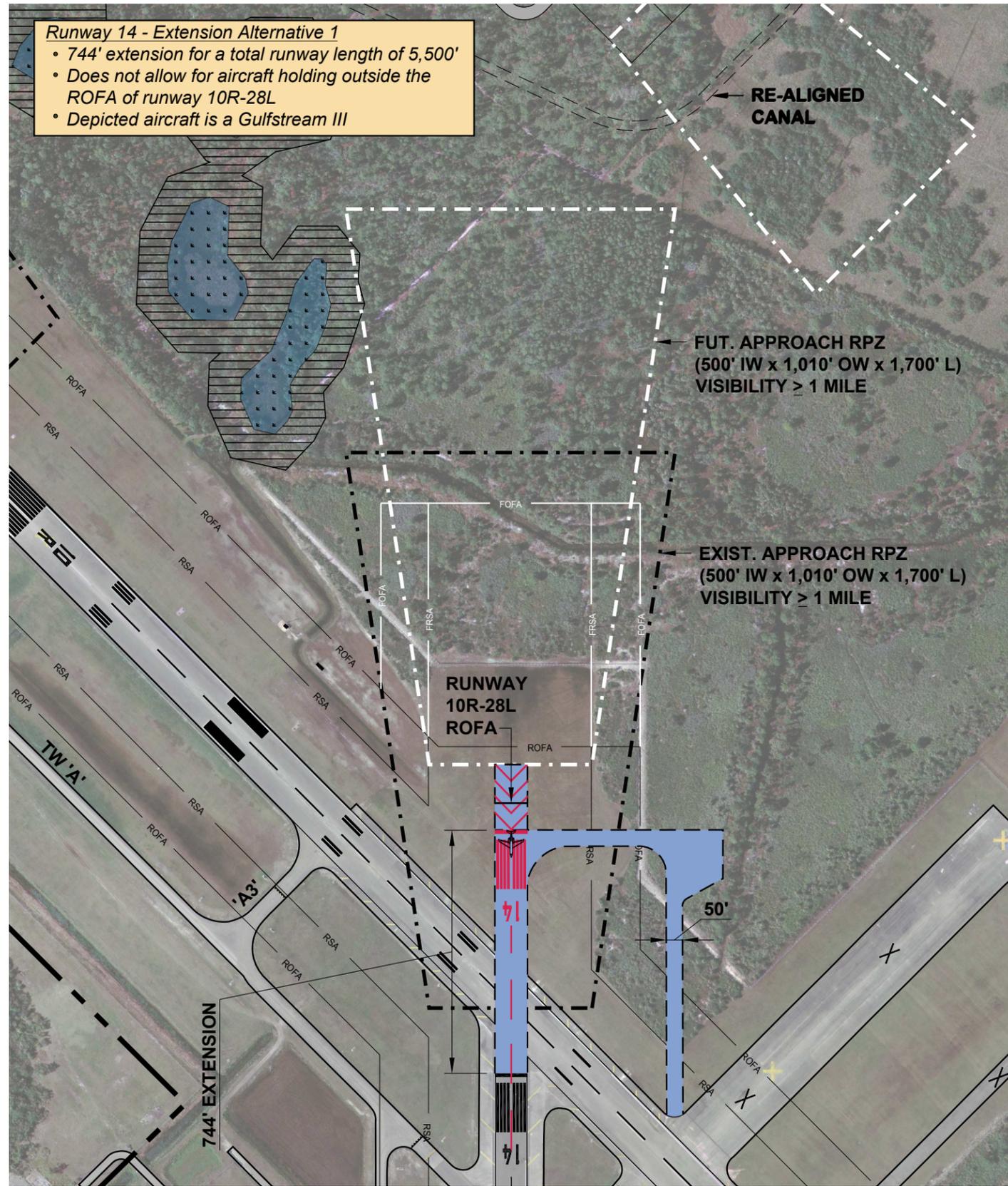
In addition to an extension of runway length, it is further recommended that Runway 14-32's load bearing capacity be increased to 60,000 pound dual wheel landing gear. The location of the two Fixed Based Operators, APP Jet Center of Ft. Pierce and Key Air Aviation, leaseholds adjacent to Runway 14-32 in conjunction with the recommendation that Runway 14-32 operate as a secondary primary runway supports the proposal that Runway 14-32 load bearing capacity and that of its parallel taxiways increase to 60,000 dual wheel capacity. Since these improvements are designated, according to the FAA Project Priority criteria, as capacity and safety projects, it is further recommended that design and construction of the extension and overlay be accomplished in the mid-term (2014-2018).

runway. Historically, the secondary primary runway's length was 80 percent of the primary runway length to accommodate existing demand but at a reduced load factor (FAA AC 150/5425-4B).

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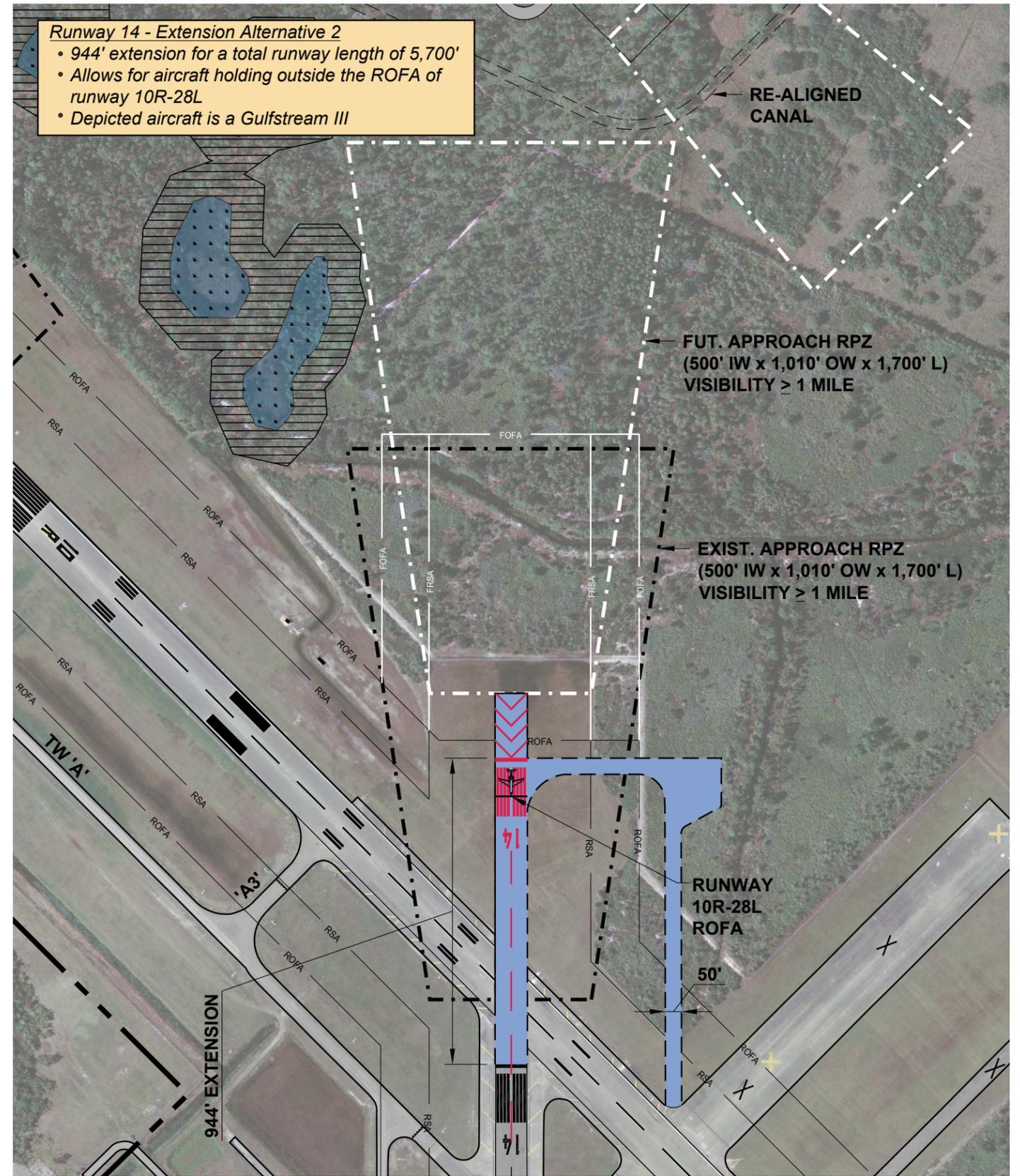
Runway 14 - Extension Alternative 1

- 744' extension for a total runway length of 5,500'
- Does not allow for aircraft holding outside the ROFA of runway 10R-28L
- Depicted aircraft is a Gulfstream III



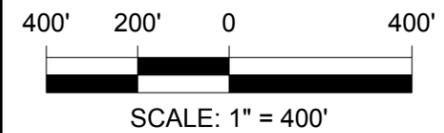
Runway 14 - Extension Alternative 2

- 944' extension for a total runway length of 5,700'
- Allows for aircraft holding outside the ROFA of runway 10R-28L
- Depicted aircraft is a Gulfstream III



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**RUNWAY 14 EXTENSION
ALTERNATIVES**



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Runway 10R-28L

Runway 10R-28L is currently 6,492 feet long by 150 feet wide, and its current load bearing capacity is 60,000 pound dual wheel landing gear. Depending upon the ultimate role of the airport (GA or commercial), runway length and pavement strength requirements were identified in **Chapter 4**.

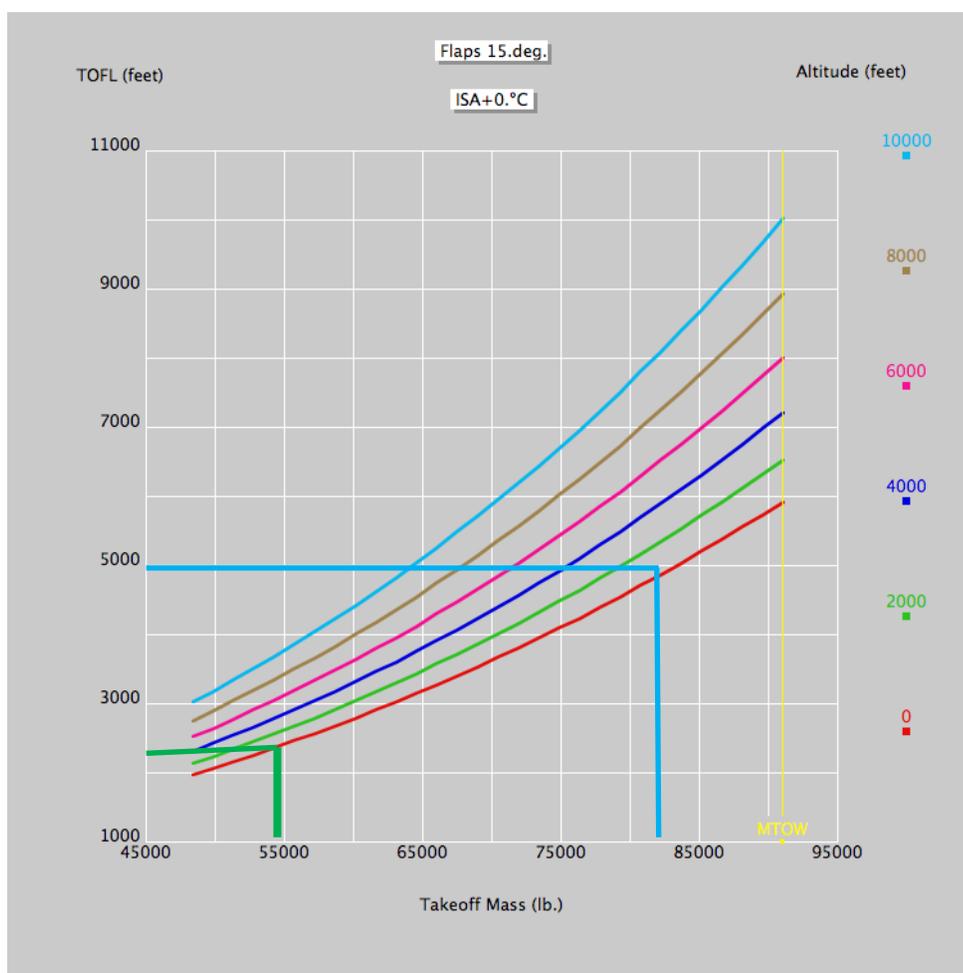
Development presented in the 1993 Master Plan Update was based upon the assumption that FPR would provide Part 121 air carrier commercial service within the twenty-year planning period. As a result based upon anticipated stage lengths, aircraft operating length requirements, and load factors, the master plan showed an ultimate runway length of 10,000 feet on Runway 10R-28L. This included a 2,600 ft extension to the west and a 900 ft extension to the east. However, to accommodate the proposed development, the FPL power transmission lines currently located on airport property would require relocation. A 10,000 foot runway would accommodate the takeoff and Part 121 landing length requirements at both maximum takeoff and landing weights for all narrow-body and the majority of wide body commercial aircraft currently on the market today. This runway length would allow aircraft to operate both coast to coast as well as overseas to England, Europe and parts of Asia, depending upon the stage length capacity of the aircraft.

Although a 900 ft extension to the east is viable, it is not cost effective due primarily to the terrain. Also any shift to the east is anticipated to require a relocation of the 70 to 80 ft above ground level (AGL) power transmissions lines located on the east side of US 1. It would shift airport operations and noise impact zones closer to noise sensitive areas off airport, including St. Lucie Village, which is contrary the airport's current "good neighbor" policy. Lastly, extending the runway east may require the initiation of declared distances to accommodate public perceptions and concerns over noise and air quality. It is, however, the current position of the FAA that it will not participate in the funding of a runway extension or other such improvement which would require the implementation of declared distances for other than the safe operation of aircraft. For these reasons, although possible, it is rather recommended that property east of the current Runway 28L threshold remain reserved for alternative aviation development, including safety area surfaces, lighting, NAVAIDS, etc.

The 2002 Master Plan Update and 2005 FAR Part 150 Study, however, both assumed that FPR would continue to serve only GA operations throughout the twenty-year planning period. As a result, no additional runway length is required to accommodate existing critical aircraft (Learjet 60) at maximum takeoff weight or future critical (Gulfstream 550) aircraft operations

at 60 percent and 90 percent³⁷ load factors as shown in Table 4-15 on page 4-33, Figure 5-9 and Table 5-10.

Figure 5-9
FAR Takeoff Lengths at ISO
Gulfstream V/550



Source: Gulfstream FAR Operational Manual, 2008 and The LPA Group Incorporated, 2009

³⁷ According to AC 150/5325-4B, 60 percent is typically used to identify runway length requirements.

TABLE 5-9 ADJUSTED RUNWAY LENGTH GULFSTREAM 550				
Load Factor	Estimated Range ¹	Est. Length @ ISO ²	Adjusted Dry Pavement ^{3 & 4}	Adjusted Wet Pavement ^{4 & 5}
60 Percent	3,600 NM	2,300 ft	2,670 ft	3,070 ft
90 Percent	5,400 NM	4,900 ft	5,680 ft	6,530 ft

Notes:
¹Normal Cruise is 6,000 NM
²Length at ISO is based upon FAR Operating Charts (59° F, sea level, flaps at 15°, dry pavement, etc.)
³Adjusted for elevation (24 ft), mean max temperature (89.8° F), & Gradient Adjustment (1.1 ft)
⁴Per FAA Criteria, rounded to nearest 10th
⁵Dry pavement adjusted upward by 15%
 Sources: Gulfstream, NOAA Temperature Data, FAA Survey Data, and The LPA Group Incorporated, 2009

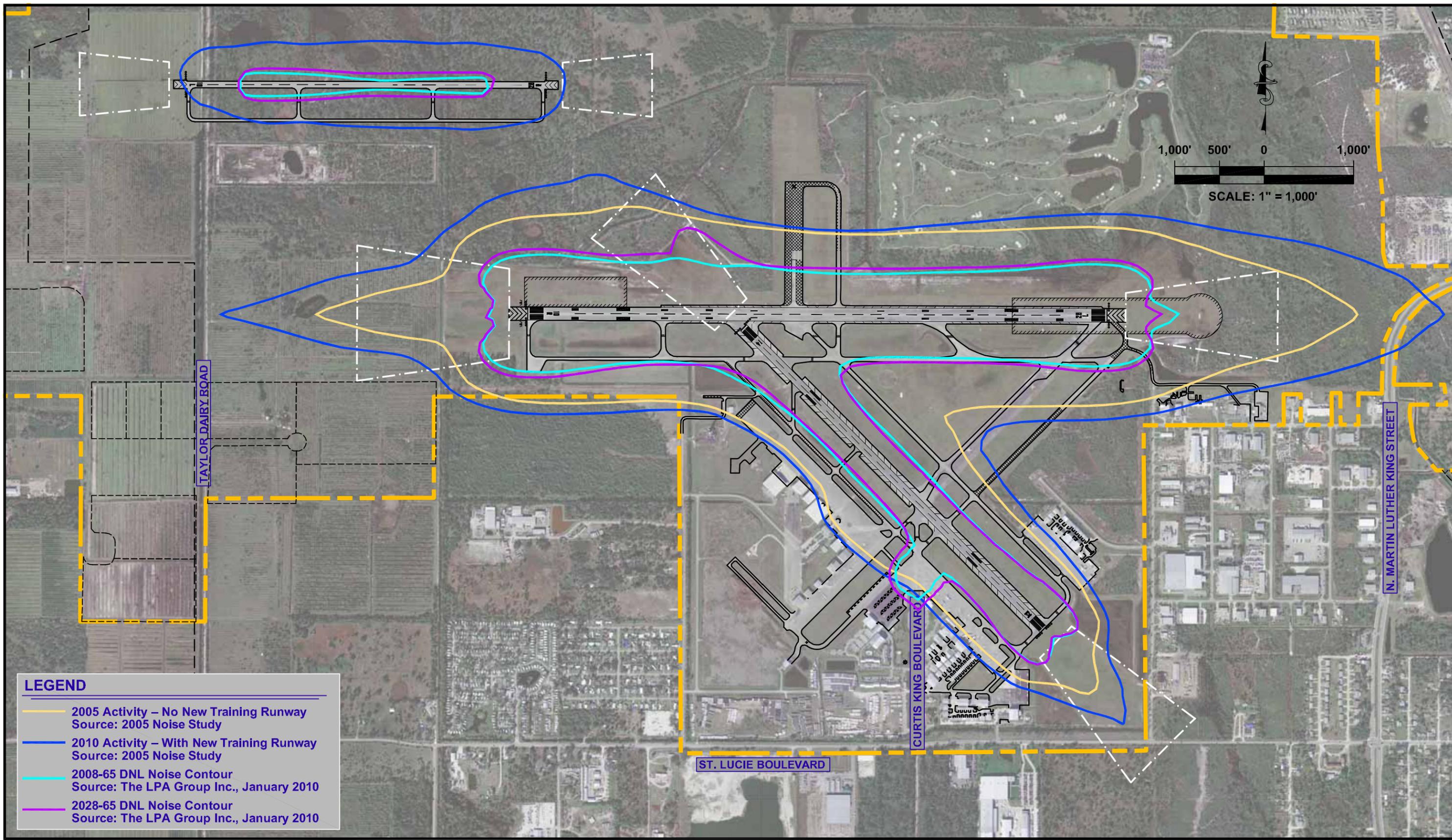
Further, in evaluating runway length requirements for regional, narrow body and wide body jets that typically operate at other commercial airports within the region, it was determined that limited commercial or commuter service could be accommodated on the current runway length with a reduction in fuel or payload. This is logical supposition since the typical stage length of 1,000 nautical miles or less represents approximately 60 percent of the average regional jet's stage length. Still a modest extension to 8,000 feet (1,508 ft extension) would allow the airport to accommodate a significant portion of both the regional and commercial fleet based upon regulatory takeoff and landing field length requirements.

The 2005 Part 150 Noise Study further recommends a shift of Runway 10R-28L approximately 1,500 feet to the west, thereby shifting noise away from residential communities east of the airport. Since the majority of perceived noise concerns were associated with repetitive flight training activities, which has now been shifted to Runway 10L-28R, the need to shift the runway was determined unnecessary at this time as shown in **Figure 5-9, 65 DNL Noise Contour Comparison**. In addition, shifting the runway, as illustrated in **Figure 5-11**, will require at a minimum:

- an extension of both Runway 10R and Taxiway A,
- relocation of the glideslope antenna and localizer
- relocation of the FPL power transmission lines,
- relocation of lighting and NAVAIDs on both Runways 10R and 28L, and
- relocation of the ARFF Radio Tower.

This project would also incur significant costs with little benefit to the airport. Further, it is anticipated based upon the current fleet, operations, and demand, that the shift of Runway 10R-28L is unwarranted. Therefore, funding from both FDOT and FAA is unlikely.

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LEGEND

- 2005 Activity – No New Training Runway
Source: 2005 Noise Study
- 2010 Activity – With New Training Runway
Source: 2005 Noise Study
- 2008-65 DNL Noise Contour
Source: The LPA Group Inc., January 2010
- 2028-65 DNL Noise Contour
Source: The LPA Group Inc., January 2010



**St. Lucie County -
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Master Plan Update**

**65 DNL NOISE CONTOUR
COMPARISON**

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Runway 10L-28R

Previous master plan updates recommended the construction of a parallel runway north of the existing Runway 10R-28L to accommodate light general aviation and training traffic ranging in length from 3,700 to 4,000 feet. The impetus for development was to improve overall airfield capacity and safety while relocating training operations, over flights and associated noise contours to airfield property.

However the 1993 Master Plan Update, based upon the assumption that FPR would become a commercial service airport, located the north runway approximately 3,100 feet north of 10R-28L to allow for an extension while limiting the potential impact on the closed solid waste landfill partially located under the Golf Course. The 1993 airport layout plan (the graphic representation of recommended master plan development) shows an extension of Runway 28R to the east ultimately providing a total available runway length of 8,000 feet. This length represents 80 percent of the proposed primary runway length of 10,000 feet.

However, Runway 10L-28R was constructed at the runway separation of only 2,500 feet in an effort to limit environmental impacts, provide adequate visibility for air traffic control at its current location, as well as facilitate a taxiway and internal roadway connection between the new runway and the existing airfield. Since the runway was designed and constructed to accommodate light (under 12,500 pounds) aircraft primarily for training, then a runway length of 4,000 feet by width of 75 feet is adequate to accommodate demand.

As part of the facility requirements analyses, the runway length and strength requirements for 10L-28R were evaluated based upon forecast operations and fleet mix within the twenty-year training period. Using **FAA AC 150/5325-4B** methodology, the current runway length is adequate to accommodate operations throughout 2028. Still the recently constructed parallel taxiway south of Runway 10L-28R was designed at a runway to taxiway distance of 400 feet, thus facilitating the potential conversion of Runway 10L-28R to a corporate aircraft or commercial service role. However, in order to accommodate such demand, an extension, widening and strengthening of the existing runway would be required in conjunction with various navigational aids and lighting. Based upon the forecast demand, such an extension is outside the twenty-year planning period.

5.7.3 Airport Alternative Development Scenarios

The purpose of airport alternative development is to address key issues identified by the Technical Advisory Committee (TAC), airport tenants and airport management as well as provide options for long-term development. Key issues include:

- Pavement rehabilitation, strengthening and other short-term requirements;
- Long-term general aviation development, including maximizing airside access;



- Long-term potential for regularly scheduled air service and associated facility requirements;
- US Custom and Border Protection requirements;
- Identifying ground access needs in conjunction with future aviation and non-aviation development, including the potential for multi-modal development;
- Identify security requirements associated with each level of potential development (i.e. general aviation, air charter/air taxi, commercial air carrier service, etc.);
- Impacts of new trends and technology (i.e. NextGen, very light jets, sustainable development, etc.);
- Comprehensive on and off airport land use planning coordinated with St. Lucie Planning and Development Services and Transportation Planning Departments to allow flexibility to accommodate long-term changes in both aviation and non-aviation related demand; and
- Develop a financially sustainable plan to support revenue enhancement and airport self sufficiency including a strategic business and marketing plan to identify and expand potential airport development.

Therefore for the purposes of this study, four airport alternatives were developed:

- Alternative 1 – GA Only/Demand Based Development
- Alternatives 2A - Limited Commercial Passenger Development
- Alternatives 2B –Regional Commercial Passenger Development
- Alternative 3 – Air Carrier Commercial Passenger Development

In an effort to facilitate discussion, each alternative scenario evaluated airside, landside, terminal, support facilities, land use, etc. development options based upon anticipated demand. However, this does not mean that one scenario must be chosen in its entirety. It is more likely that based upon input received from the TAC, tenants, community and BOCC that ultimate development will consist of a hybrid of the alternatives discussed.

All three alternative options address key issues including pavement and airfield design requirements, general aviation demand, aviation and non-aviation development, etc. However, only Alternatives 2 and 3 to varying degrees address the potential for some level of commercial service at FPR. Since commercial service forecasts were not developed as part of this master plan update due to limited information, proposed commercial requirements were based upon FAA and TSA regulations and service level requirements.

Order of magnitude costs associated with alternative development options were provided for comparison only. Cost estimates, projects associated with the preferred development, and project phasing were further refined within the preferred alternative section of this chapter as well as **Chapter 7, Airport Implementation Plan**. At the request of airport management and the Board of County Commissioners, projects and associated cost estimates were identified as



either a minimum requirement or recommended project in support of proposed aviation development demand. As a result, two order of magnitude cost estimates were provided for each scenario: order of magnitude costs associated with only the minimum projects required, and order of magnitude costs associated with both required and recommended projects.

Also, draft project phasing shown for each alternative is based on demand rather than financial feasibility. It is important to note that some project costs may be privately funded or may be spread over multiple years. This will be discussed in more detail in **Chapter 7** of this report.

Building area concepts were developed with the goal of creating a facilities plan that exhibits the following characteristics:

- Flexibility: A plan that is demand-responsive and can adjust over time to changes in quantifiable demands as well as changes in the nature of demand.
- Vision: A plan that addresses probable future aviation trends and technologies, as well as trends in other transportation arenas.
- Definition: A plan that sets a sure course of action for the short-range, and is clearly supported and realistic.
- Order: A plan that views each part of the landside system as a interrelated part of the whole airport and regional transportation system
- Balance: A plan that can extend the landside to its required fullest extent while maintaining balance with the capacity of the fully expanded airside.
- Convenience: A plan that enables FPR and its tenants to achieve a high level of public service.
- Stability: A plan that properly guides future growth that FPR and its tenants may require over time.
- Economic Soundness: A plan that enables FPR and its tenants to prosper.
- Suitability: A plan that meets the needs of St. Lucie County and existing and future airport tenants and users.

Therefore, ultimate airport development both within and beyond the twenty year planning period was based upon recommendations provided during the October 2009 meetings. An overview of the preferred development scenario is provided in **Sections 5.9 and 5.10** of this chapter.



Baseline Airport Development

Using the approved FAA forecasts and capacity requirements as a baseline, projects were identified to accommodate facility capacity shortfalls over the twenty-year planning period. These projects or a variation thereof were included in all four airport alternative development scenarios: general aviation (1), limited commercial passenger service (2A) regional commercial passenger service (2B), and air carrier passenger service (3). These baseline projects, as defined in **Table 5-10**, were further refined based upon federal guidance and the potential for state and federal funding as either required or recommended. Project costs and phasing will be further refined in **Chapter 7, Airport Implementation Requirements**.

Recent improvements at FPR included an overlay of Runway 10R-28L, completed in December 2009, which allows approximately 1,200³⁸ operations of 90,000 lbs aircraft annually. However, substantial usage of heavy aircraft will decrease the useful life of the airfield pavement.

Phase	Required Projects	Recommended Projects
Short-Term Development	Security Fencing Improvements	Install REILs – Runways 28L & 10L-28R
	Runway Pavement Evaluation - Runway 14-32	Install PAPIs - Runway 10L-28R
	Install FAA Maintained Approach Lighting (ODALS, MALS, etc.) on Runway 10R	Rehabilitate ATCT Facilities
	Install Electrical Vault to accommodate FAA Approach Lighting on Runway 10R	Airport Strategic Business and Marketing Plan, including airport property GIS survey
	Replace VASIs with PAPIs - Runway 10R-28L	Install Bird Tracking Radar
	Rehabilitate Taxiway B	Extend Perimeter North (Hammond Road)
	Rehabilitate and Widen Taxiway C	Airport West Commerce Park Development
	Rehabilitate and Widen Taxiway A	Develop property between St. Lucie and Curtis King – non-aviation development
	Relocate Lighted Segmented Circle	Tenant Planned Development APP Jet Center of Ft. Pierce Development (Est.):
	FAR Part 150 Study	2 - 80 x 80 SF Corporate Hangars with Apron and Taxilanes
	Runway 10R-28L Strengthening Cost Benefit Analysis	1 - 100 x 100 SF Corporate Hangar with Apron and Parking
Runway 10R-28L Strengthening Environmental	1 - 15 Unit T- Hangar	

³⁸ AECOM FAARFIELD Runway Pavement Strength analysis.



TABLE 5-10 BASELINE DEVELOPMENT PROJECTS		
Phase	Required Projects	Recommended Projects
	Assessment/Environmental Impact Statement	
	Permitting and Drainage Improvements	1- 6 Unit T- Hangar
	Realign Taxiway D-1 and remove old pavement	Drainage Improvements
	Relocate Drainage Ditch and Road to avoid New RSA associated with extension of Runway 14-32.	Tenant Planned Development Key Air Development Plan (Est.):
		Apron Construction (2 ramps and connectors)
		Roadway and Auto Parking
		2- Corporate Hangars
		Drainage Improvements
Mid-Term Development	Strengthen (90,000 lbs DW) Runway 10R-28L	ARFF Helipad and Associated Facilities
	Strengthen (90,000 lbs DW) Taxiways A, B, C, D and E*	Install PAPIs - Runway 14-32
	Extend Runway 14-32	Install REILs – Runway 14-32
	Strengthen (60,000 DW) Runway 14-32	Acquire Parcels 40-42
	Extend Taxiway B, includes lights, markings and holding pad	Tenant Planned Development APP Jet Center of Ft. Pierce Development (Est.):
	Strengthen (90,000 lbs DW) Aprons South, East, Center & Run-up	5 - 80 x 80 SF Corporate Hangars with Apron and Taxilanes (South)
	Strengthen Taxiways C-7 and C-8 between Runway 14-32 and Taxiway C to 60,000 lbs dual wheel	4- 10,000 SF Hangars
	Widen Taxiway E from Taxiway C to Runway 14-32 to 50 feet.	1-12,000 SF Hangar
	ALP/Master Plan Update	1-3,600 SF Hangar
		Southwest Apron Construction
		Drainage Improvements
		Tenant Planned Development Key Air Development Plan (Est.):
		2- Corporate Hangars with Offices
		Apron Construction (2 ramps and connectors)
	Auto Parking	
	Drainage Improvements and Permitting	
Long-Term Development	Airport Master Plan and ALP Update	
	Upgrade existing parts of Perimeter Fence adjacent to airside	North Industrial/Commercial Development:
	Install additional perimeter fencing and access control associated with new aviation and non-aviation development and land acquisition	Utilities and Infrastructure
		Environmental Assessment with tree and protected species survey and

TABLE 5-10 BASELINE DEVELOPMENT PROJECTS		
Phase	Required Projects	Recommended Projects
		GPS wetlands delineation
		Access and Signage
		Drainage
		Non-Aviation Development – Former Ridgehaven Subdivision:
		Utilities and Infrastructure
		Environmental and Permitting
		Access Roads and Signage
		Drainage
		Additional Perimeter Security Fencing

Notes: *This refers to the portion of Taxiway E from Runway 14-32 to Taxiway A (~2,094 linear feet)
Source: The LPA Group Incorporated, 2010

With the exception of Alternative 3, *Air Carrier Passenger Service*, the design aircraft for pavement strength, runway and taxiway width and separation requirements was the Gulfstream 550, **Figure 5-12**. The Gulfstream 550 is defined as a heavy³⁹ corporate aircraft with maximum takeoff weight of 91,000 pounds, has a dual wheel landing gear configuration and aircraft reference code of C-III.⁴⁰

**Figure 5-12
Gulfstream 550**



Source: Gulfstream Aviation, 2009

³⁹ “Heavy” refers to aircraft with maximum takeoff weights (MTOW) greater than 60,000 pounds.

⁴⁰ Aircraft reference code is based upon aircraft approach speed (i.e. A-E), wingspan (I-V) and tail height (I-V)



A brief summary of required and recommended projects is provided as follows. Anticipated phasing is based upon design, engineering and environmental requirements rather than financial feasibility and funding. As a result, projects identified in a specific phase in this chapter may shift outward as a result of funding needs in later sections of the report.

Short-Term Development:

Required Projects

- **Security Fencing Improvements** – Installation of perimeter/security fencing and access control systems at FPR are on-going. Additional security fencing consisting of a combination of chain link and barbed wire should be installed around critical areas of the airfield, including the fuel facilities, hazmat storage, etc. to limit either wildlife or unauthorized access to critical facilities. In cases where fencing could potentially impact navigational equipment, a plastic or composite fence could be used since it will not interfere with approach signals. In addition, all future property acquired by the Airport and all new construction, especially associated with the Airport Operating Area (AOA) should be fenced. Restricted access points should be installed to ensure the security of the airfield, and all airside buildings and or parking area should have adequate security fencing, controlled access gates and overhead lighting.
- **Runway 14-32 Pavement Strength Evaluation** – As noted earlier in this chapter, although the pavement strength of Runway 14-32 is published at 15,000 pound single wheel, historical evidence suggests that portions of the existing pavement may be stronger. Therefore, a pavement evaluation is required in the near term to determine the pavement base strength and to identify projects necessary to accommodate demand.
- **Replace 4-Box VASIs with 4-Box PAPIs on Runway 10R-28L** – Runway 10R and 28L are equipped with 4-Box Visual Approach Slope Indicator equipment. In order to maintain safety and provide additional visibility during nighttime or other low-light conditions, the VASIs should be replaced by 4-Box Precision Approach Path Indicator lights (PAPIs) once the VASIs have exceeded their useful life span.
- **Install Approach Lighting Equipment (i.e. Omni-Directional Approach Lighting System (ODALs) or Medium Intensity Approach Lighting System (MALS)) on Runway 10R** – As directed by FAA Advisory Circular 150/5300-13, an instrument approach with a visibility minimum of $\frac{3}{4}$ statute mile requires the installation of short approach lighting such as ODALs or MALS. Runway 10R is equipped with an ILS system (glide slope and localizer antenna) with a visibility minimum of $\frac{3}{4}$ -statute mile due to the current location of the FPL transmission lines to the west. Therefore, the installation



- of ODALs or MALS is required per FAA Criterion; however, it is **not** necessary to upgrade current runway lighting from medium intensity to high intensity lighting.
- **Rehabilitate Taxiways A, B and C** – According to the FDOT pavement evaluation and recent evaluation, Taxiways A, B and C require rehabilitation in the near term to preserve their useful life.
 - **Widen Taxiways A and C** – The forecast analysis revealed that corporate aircraft operations at FPR will continue to increase throughout the twenty-year forecast period. This combined with current operations by airport design group III aircraft (e.g. DC-3 Missionary Flights) requires taxiways serving these aircraft to be 50 feet in width. Portions of Taxiways A and C are 50 feet or greater in width. Thus, as part of pavement rehabilitation, expansion of these taxiways and relocation of taxiway edge lighting is required.
 - **Relocate Lighted Segmented Circle** - The current location of the segmented circle south of Taxiway A and west of Taxiway B is not conducive to training operations on Runway 10L-28R. Therefore, a new location is recommended, especially since the airport implemented specific traffic patterns and voluntary noise abatement procedures associated with Runways 10L-28R, 10R-28L and 14-32. Thus, the segmented circle should be relocated to the open area north of Runway 10R-28L adjacent to the former runway pavement allowing the segmented circle to be seen by all users.
 - **FAR Part 150 Study** - Since the FAA requires an environmental assessment to be prepared to evaluate the potential impacts of strengthening the pavement on Runway 10R-28L and 14-32 to accommodate larger and heavier aircraft, an updated FAR Part 150 Noise Study will also likely be warranted.
 - **Runway 10R-28L Strengthening Cost Benefit Analysis** – Airport capacity related projects requiring at a minimum of \$5 million in discretionary funding may warrant a benefit cost analysis (BCA). The purpose of this analysis is to identify the potential benefits associated with this project and compare to the overall costs. This document is used to determine funding and high priority projects. Depending on how the FAA classifies the strengthening of Runway 10R-28L, a BCA may or may not be necessary.
 - **Runway 10R-28L Strengthening Environmental Assessment** – Airport Management early in the master plan process met with FAA Airport District Office to discuss the potential to strengthen Runway 10R-28L to accommodate aircraft with MTOWs up to 90,000 pounds. During that meeting, FAA stated that an environmental assessment would be required since the current operational fleet mix would likely change. Therefore, before funding can be obtained for the pavement strengthening, an environmental assessment would need to be approved.



- **Permitting and Drainage Improvements** – The majority of construction projects especially associated with increased impervious surface such as runway, taxiway, apron, hangar, roadway improvements, etc. would require project permitting and the installation of drainage improvements (e.g. ponds, pipes, drainage ditches, etc.) to accommodate increased runoff and contamination. A Stormwater Master Plan was developed in conjunction with this project. Recommended drainage improvements based upon the TAC, Public and BOCC recommended airport development are provided in **Chapter 6, *Recommended Airport Development***, of this report.
- **Realign Taxiway D-1** - The current taxiway provides access to small aircraft hangars on the east side of the airfield as well as provides ARFF access to the airfield. The current D-1 Taxiway connects to the blast pad of Runway 28L, which is not acceptable since the blast pad is a non-movement area. Therefore, Taxiway D-1 will be relocated to alleviate this issue, and old pavement will be removed.
- **Relocate Road and Stormwater Ditch North of Runway 14** – To accommodate the proposed extension of Runway 14-32, the current stormwater drainage ditch and unpaved perimeter road will need to be relocated to accommodate the 500 x 1,000 foot runway safety area associated with the proposed extension.

Recommended Projects

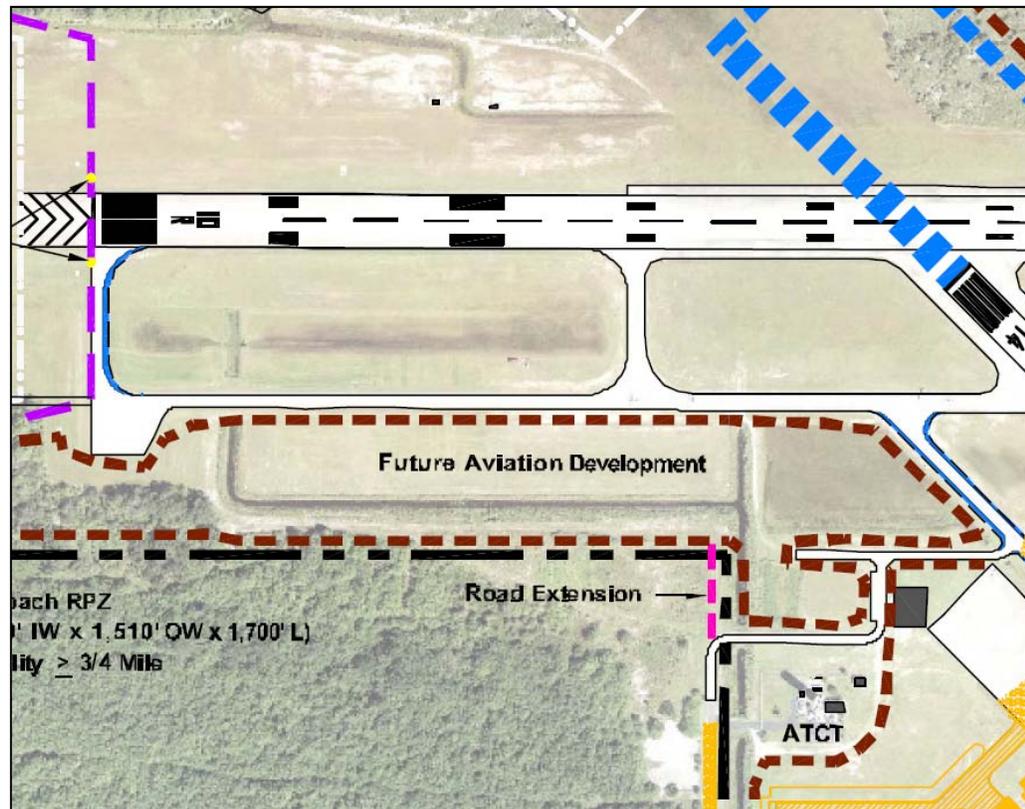
- **Install REILs on Runways 28L, 10L and 28R** – Runway end indicator lights (REILs) identify the runway thresholds, and also provide enhanced visibility during nighttime or low-light conditions. Therefore, in conjunction with proposed development and to enhance the safety of operations at FPR, the installation of REILs on Runways 28L and 10L-28R is recommended.
- **Install 4-Box PAPIs on Runways 10L and 28R** – The centerline approach to Runway 10L includes the recently (2009) relocated FPL power transmission lines. Therefore, it is recommended that 4-box PAPIs be installed on Runways 10L and 28R to improve visibility and overall safety for nighttime training operations.
- **ATCT Rehabilitation and Tower Study** – The air traffic control tower at FPR was constructed in 1985. ATCT provides oversight to aircraft flying within FPR's Class D airspace as well as vehicles and aircraft operating on the ground within defined movement areas. Current tree clearing projects have provided clear line of sight to the new training runway. However, due to the age of the ATCT and potential airfield improvements, rehabilitation and possibly a Tower Siting Study is recommended in conjunction with long-term development.
- **Partial Internal Perimeter Road** – The airport currently has a partial perimeter road which runs parallel to Taylor Dairy Road to the east before turning east toward the



airfield, thereby providing access from the main airfield to the new training Runway 10L-28R. However, this road dead-ends near the West Airport Commerce Park. Thus, in conjunction with planned aviation and non-aviation development, it is recommended that an extension of the existing road currently located west of the air traffic control tower (Hammond Road) be constructed to provide access to potential aviation and non-aviation development as shown in **Figure 5-13**. Included in this access road extension would be a security gate to limit unauthorized access to the airfield.

- **Airport Strategic Business and Marketing Plan** – The last Airport Business Plan was completed in 2003. Thus in conjunction with the recommendations outlined in this master plan update as well as Countywide long-term plans and business development initiatives, it is recommended that a strategic business and marketing plan including a GIS Property Map and survey of airport property be developed to allow airport management to identify short and long-range goals and opportunities while developing a strategic vision that identifies tangible assets (i.e. image, available land and leaseholds, foreign trade zones, surface access and multi-modal development, etc.) that can be used to partner with the regional community to enhance quality of life.
- **Develop southwest property between Curtis King Blvd and St. Lucie Blvd** – According to airport management, this southwest parcel is the next area slated for development. The location of this property adjacent to St. Lucie Blvd. and Curtis King Blvd. (airport entrance road) makes it an ideal location for either non-aviation or aviation support facilities that do not need direct access to the airfield. As such, this location could be used for industries currently being targeted by the County including manufacturing, clean energy, information industries, professional, scientific and technical services, etc. as well as an aviation education facility, an aviation-related commercial business or for restaurant, offices, gas station and other facilities that could support aviation and non-aviation demand. It is important to note, however, that such development is not exempt from concurrency requirements, and, therefore, the impacts on St. Lucie County infrastructure would need to be evaluated.

**Figure 5-13
Perimeter Road Extension**



- **Closure of a portion of Taxiway D** – In conjunction with planned Key Air Aviation’s leasehold development east of Taxiway B and south of Taxiway E, Taxiway D will be closed and incorporated into the planned FBO development. As a result, the closure of Taxiway D will coincide with proposed FBO development.
- **Install Bird Tracking Radar System** – According to the FAA Bird Strike Database, aircraft strikes associated with migratory and large birds has historically occurred both at the airport and within surrounding airspace. Due to the number of wetlands and undeveloped property on the airport property, it is recommended, although not required, that some sort of Bird Tracking Radar System be installed at the airport.
- **Automobile Parking** - As with the construction of any new facilities, additional parking will be required for each type of development shown. Aircraft storage and commercial developments shown each have their own designated parking facilities which are included as part of the leasehold development.
- **Environmental Studies** – A Wetland and Protected Species Enhancement Plan is currently in progress. This project is for the maintenance of Runway 10L-28R (new



training runway) mitigation area and for gopher tortoise and vegetation monitoring. This area includes a 60 acre wetland mitigation, 60 acre gopher tortoise relocation area, and 30 acre vegetation parcel. Further, in concurrence with planned development, environmental studies required for mitigation and permitting will be provided. The FAA Airports District Office also requires an environmental assessment to determine the potential impacts associated with strengthening Runway 10R-28L and 14-32 as well as the extension of Runway 14. Because of the sensitive nature of several portions of the existing property and concerns by nearby residents, areas on-airport were preserved for wetland, tree and protected species mitigation as well as future conservation. Proposed development, with the exception of planned FBO leasehold development, is limited to upgrading existing infrastructure. Thus, the environmental impacts associated with Alternative 1 are expected to be limited.

- **Airport West Commerce Park Development** - Several parcels and some infrastructure (i.e. roadways, utilities, etc.) have already been added to the Airport West Commerce Park which is located on airport property east of Taylor Dairy Road and south of Runway 10L-28R. Because of its location to the existing airfield, FAR Part 77 surfaces as outlined in the St. Lucie Comprehensive Plan limit the building heights to approximately 50 feet above ground level in order to limit potential impacts to the approach surface and visibility requirements. It is important to note that portions of the Airport West Commerce Park property is located within the 40:1 departure surface criteria as denoted in FAA AC 150/5300-13 Appendix 2. Therefore, any development will require the submittal of a *Notice of Proposed On-Airport Development* to be presented to FAA for review and approval.

Both Fixed Based operators at FPR, APP Jet Center of Ft. Pierce and Key Air, have substantial leaseholds on the airport. Both operators provide fuel and APP Jet Center subleases aircraft storage facilities on the airport since the County primarily focuses on land leases. During the master plan process, short and mid-term development plans by both operators were provided. Planned development exceeds general aviation facility requirements for the twenty-year planning period as illustrated in **Table 5-11**.



**TABLE 5-11
GENERAL AVIATION REQUIREMENTS**

Requirements	Existing	2013	2018	2023	2028
Total Apron Facilities (SY)	198,294				
Aircraft Tie-Downs (#)	237				
Transient Apron (SY)	65,000	30,500	33,000	36,500	40,500
Transient Apron Parking (#)	~80	30	33	36	40
Based Apron (SY)	100,000	41,625	46,125	51,125	57,125
Based Apron Parking (#)	~157	83	92	102	114
Hangar/Building Storage (SF)	~700,000				
T-Hangars (SF)	20,000	81,250	87,188	93,750	101,563
T-Hangars (#)	17	65	70	75	81
Corporate Hangars (SF)	300,000	346,875	410,000	489,375	606,250
Corporate Hangars (#)	~90	85	98	113	134
FBO Terminal Requirements	~30,000	22,875	24,750	27,375	30,375
ATCT (SF)	500	500	500	500	500
Restaurant (SF)	450	450	450	450	450
Dormitory	18,600	18,600	18,600	18,600	18,600
St. Lucie County Fire Station	6,900	6,900	6,900	6,900	6,900
US Customs and Border Protection*	6,500	6,500	6,500	6,500	6,500
Airport Administration Building	3,380	4,500	4,500	4,500	4,500

*Note: * US Customs for GA Airport only requires only 1,474 SF of space.*

Sources: APP Jet Center of Ft. Pierce, Key Air Aviation, Airport Management, 2007 Airport Layout Plan, Storm water Pollution Prevention Plan, and The LPA Group Incorporated, 2009

FBO Development is focused upon expansion of current traffic as well as the attraction of heavier corporate aircraft operations. It is important to note that the airport tenants are responsible for any potential National Environmental Policy Act (NEPA), drainage and permitting compliance requirements associated with planned development. Proposed short-term development was estimated as follows:

APP Jet Center of Ft. Pierce Planned Development

- **Corporate Hangar Development** – Construction of two 80 x 80 square foot and one 100 x 100 square foot corporate hangars. All construction includes required apron, taxilane construction, automobile parking and permitting requirements.
- **T-Hangar Development** – According to graphics provided, one 15-unit and one 6-unit T-Hangar including taxilanes are planned for the southwest portion of their current leasehold.
- **Drainage Improvements** – As stated earlier, any increase in impervious surface will require permits and approved drainage improvements to accommodate the increased storm water output. Because the majority of drainage outfalls at FPR consist of ponds



and drainage ditches, storm water piping may be required to support mid and long-term planned development.

Key Air Development

- **Apron Construction** – This development includes the construction of approximately two aprons (~38,800 SY) to accommodate planned hangar and aircraft parking requirements. This development includes lighting, markings, etc and incorporates former Taxiway D.
- **Taxilane Construction** – A 750 x 35 foot taxilane is proposed to provide access to bulk hangar facilities on the northeast portion of the leasehold.
- **Hangar Construction** – Two 100 x 500 large bulk storage hangars including office space and automobile parking is planned in the short-term. The remainder of planned hangar construction, according to FBO management, will be completed within the mid-term development period (i.e. 2014-2018) or sooner if demand warrants.
- **Roadway and Auto Parking** – In conjunction with planned hangar construction, improved surface access and contiguous automobile parking is planned in the short-term to accommodate tenant planned development.
- **Drainage Improvements** – Discussions with Key Air management revealed existing plans and current efforts to permit and construct a storm water pond on their leasehold to accommodate planned development through the next 20-years.

Mid-Term Development (2014-18)

Required Projects

- **Strengthen Runway 10R-28L** – Although forecast demand in the short-term (5-years) does not warrant an increase in Runway 10R-28L pavement strength beyond the current 60,000 lbs. dual wheel design, it is recommended that the pavement strength be increased to 90,000 lbs in the planning mid-term (2014-2018) to accommodate an anticipated increase in heavier (>60,000 lbs dual wheel) corporate aircraft demand. This increase in heavy corporate traffic is anticipated to coincide with planned development by both APP Jet Center of St. Lucie and Key Air Aviation.
- **Strengthen Taxiways A, B, C, D and E including Connectors** - Since these taxiways support operations on Runway 10R-28L as well as provide access to the existing and future airport administration and FBO facilities, the taxiway pavement load factor should be increased to accommodate a 90,000 lb dual wheel load.
- **Widen Taxiway E** - Taxiway E between Runway 14-32 and Taxiway C is currently 35 feet in width, thus to accommodate ARC C-III aircraft the pavement will be increased to 50 foot width. This project will require relocation of the taxiway edge lighting and associated pavement markings.



- **Strengthen Apron South, Apron East, Apron Center and Apron Run-Up on Runway 10R** – As part of the recommended strengthening of both Runways 10R-28L and 14-32, apron facilities would also be strengthened to accommodate the anticipated aircraft operations. Pavement movement and parking markings will also be upgraded to accommodate use by various sized aircraft including small training and large corporate jet aircraft.
- **Extend Runway 14** – As discussed under **Section 5.8.2, Runway Alternatives**, Runway 14 should be extended by approximately 945 feet to provide a total pavement length of 5,700 feet. This will remove the Runway 14 threshold from Runway 10R-28L's object free and safety areas thereby improving safety and long-term capacity. Further, this allows Runway 14-32 to operate as a secondary primary runway by providing greater than 80 percent of the runway length of the primary runway (10R-28L). This will allow ATC greater flexibility and provide an alternative runway to accommodate existing and forecast demand. Note: this project has been recommended since the 1983 Master Plan Update.
- **Strengthen Runway 14-32** - If the existing pavement structure is insufficient for current and future fleet mixes then a pavement strengthening design and upgrade will be needed. Pavement strengthening will be accomplished through asphalt overlays. Overlay thickness will be determined using the revised FAA "Airport Pavement Design and Evaluation" Advisory Circular (AC 150/5320-6E) issued on September 30, 2009. The FAA pavement design software, FAARFIELD, will be utilized to assist with the additional pavement thickness required.

Strengthening is recommended because of the location of the two FBO leaseholds to the northeast and southwest of Runway 14-32 and its role as a secondary primary runway. As a result, the strength of Runway 14-32 ultimately should accommodate 30,000 pound single wheel and 60,000 pound dual wheel land gear load factors. This load factor in conjunction with the recommended runway length of 5,700 feet will accommodate the majority of short to mid-range corporate jets currently operating at FPR. However, anticipated costs associated with this project will depend upon the findings of the pavement strength evaluation.

- **Extend Taxiway B** - However, in conjunction with the extension of Runway 14 to the northwest, it is recommended that parallel Taxiway B be extended to provide access to the new runway threshold. Taxiway B will provide a 90 degree connector taxiway to the threshold of Runway 14 thereby providing adequate line of sight, and a holding pad would be constructed to the east of Taxiway B to provide additional flexibility for aircraft movement and capacity. Additional medium intensity taxiway lights (MITL), markings and lighted signage are also recommended in accordance with FAA criteria.



- **Strengthen Taxiways C-7 and C-8** – Since the connector Taxiways C-7 and C-8 will primarily serve Runway 14-32, ARC C-II, which is being strengthened to 60,000 lbs dual wheel to accommodate mid-range corporate jets, Taxiways C-7 and C-8 are also recommended to be strengthened.

Recommended Projects

- **ARFF Helipad and Associated Facilities** – The St. Lucie County Fire Department is in the process of designing an emergency response facility to support helicopter patient transport operations. According to the Fire Department representative, development is planned west of the existing fire station and east of Taxiways E and D. As part of this development, a notice of proposed landing area will need to be submitted to both FAA and FDOT for evaluation and approval.
- **Install PAPIs and REILs on Runway 14-32** – with the recommended extension of Runway 14-32 to (1) eliminate the non-standard intersection and (2) accommodate light to mid-size jet aircraft, the installation of additional visual aids to enhance visibility and improve overall safety is recommended. REILs on Runway 14 should be shielded as to not impact aircraft on approach to Runway 10R.
- **Construct Taxiway B Holding Pad** – As part of the extension of Runway 14-32 and Taxiway B, Air Traffic Control Management suggested the installation of a holding pad on the east side of Taxiway B. This would eliminate any perceived incursions to Runway 14 for aircraft on approach and provide an area outside the object free zone for aircraft run-ups.
- **Acquire Parcels 40-42**- Parcels 40, 41 and 42 are located to the east of North King's Highway adjacent to airport property to the north, south and east. Acquisition of these parcels is recommended for site protection, compatible land use, and additional revenue potential since they are currently zoned as residential. Purchasing these parcels would support planned aviation and non-aviation development on the west side of the airfield. Further, direct access to North King's Highway makes these parcels and contiguous airport property excellent locations for the County's targeted industries, such as biomedical, research and development, finance, service industries (i.e. hotels), etc.

Tenant Planned Development APP Jet Center of Ft. Pierce

- **Corporate Hangars** – Proposed development on the south side of the APP Jet Center leasehold include construction of several corporate hangars: five (5) 6,400 square foot,, four (4) 10,000 square foot, one (1) 12,000 square foot, and one (1) 3,600 square foot, including associated apron and taxilanes. Corporate hangar development is based upon existing and forecast demand by businesses and other users that would cater to corporate aircraft operators.



- **T-Hangars** – Increased air traffic congestion in south Florida along with higher fuel and aircraft storage prices is anticipated to shift general aviation demand to FPR. This trend for general aviation to move away from busy congested airspace has already started to occur. Several former Ft. Lauderdale Executive and West Palm Beach International Airport tenants have shifted their operations to St. Lucie County.
- **Drainage Improvements** – As mentioned earlier, any significant increase in impervious surface will require permitting and drainage improvements to accommodate the additional outfall demand.

Tenant Planned Development Key Air

- **Bulk Hangar Construction** – According to Key Air's planned development, two (2) additional 100 x 500 SF hangars would be constructed adjacent to the hangars and apron constructed in the short-term.
- **Apron Construction** – to accommodate anticipated tie-down and apron demand associated with the hangar construction, an additional 38,800 square yards of pavement would be constructed. All apron construction will be designed to accommodate aircraft with maximum takeoff weights up to 90,000 lbs dual wheel.
- **Drainage Improvements** – Key Air Management in conjunction with proposed aviation development is in the process of designing drainage improvements as part of their short and mid-term development plan. As a result, associated costs, with the possible exception of the permit, is likely to be incurred by Key Air.

Long-Term Development (2019-2029)

Recommended Projects

- **Airport Master Plan Update** – Typically an airport master plan and airport layout plan update, which includes the Exhibit "A" Property Map, is updated every five to 10 years depending upon the needs and requirements of airport management. It is important to note that in order to obtain federal and state funding, projects must be shown graphically in the ALP. Further, the property map must be maintained to accommodate grant assurance requirements.
- **Environmental Assessment with tree and protected species survey and GPS wetland delineation - North Industrial/Commercial Park** – Prior to any potential commercial (aviation or non-aviation) on the north side of the airfield, an environmental assessment with tree and protected species survey as well as GPS wetland delineation will be required with the proposed 406 acres site to determine the number and type of trees and associated wildlife which would be impacted by proposed development. The tree survey will also determine if mitigation can be provided on existing airport property or if the use of a mitigation bank will be required.



- **North Industrial/Commercial Park** – Airport property south of Indrio Road and north of the Fairwinds Golf Course has previously been designated for future airport commerce and industrial use. While this area has limited access to the existing airfield, it does provide a unique locale for non-aviation development especially with planned widening of Indrio Road. Further, use of this property for development of the County’s targeted industries (i.e. clean energy, manufacturing, information services, finance and insurance services, management and distribution, professional, scientific and technical services, etc.) would provide a buffer between airfield operations and residential development north of Indrio Road. However, access, utilities and environmental issues must first be addressed prior to development. As noted earlier, concurrency requirements with St. Lucie County must also be addressed prior to development; however, establishment of an industrial park would provide an additional source of revenue to support proposed long-term aviation development.
- **Roadway, Access and Signage** – Access to existing and future leaseholds can be provided through the existing roadway network, including: Industrial 33rd Street and Industrial Avenues 1, 2 and 3 on the east side of the airfield; St. Lucie Blvd and Airman’s Drive on the west side of the airfield; and Taylor Dairy Road which provides access to the Airport West Commerce Park and training runway facilities. Additional directional signage will also be needed for new on-airport tenant leaseholds as well as along planned improvements to Indrio Road, St. Lucie Blvd, King’s Highway, the Florida Turnpike and I-95.
- **Utilities, Infrastructure and Traffic Concurrency** – As part of any development, infrastructure will need to be put into place to accommodate planned development. The infrastructure needs, however, will be dependent upon development since an aircraft storage hangar will not require the same level of utilities that a fixed based operator or office facility would require. Although aviation facilities (passenger terminal, hangars, maintenance, repair and overhaul facilities, etc.) are all exempt from transportation concurrency requirements as outlined in HB7203 of the Florida Growth Management Code, the airport must still coordinate planned growth with St. Lucie County Planning and Development Services and Transportation Planning Organization to accommodate water, sewer and electrical requirements.

Further, the proposed Airport West Commerce Park is not exempt from the transportation concurrency requirements. Concurrency, in terms of traffic, means that enough road facilities need to be available to accommodate the additional level of traffic generated by new development. If the road systems cannot accommodate anticipated traffic related to the development or the road system cannot be improved to a level that could accommodate such demand within six years by financial



commitments made by the City, County, State or developer, then development will not be approved.

Concurrency helps balance the timing and sequencing of development in relation to transportation improvements, such as new streets and traffic signals. However, concurrency only applies to arterial streets; local streets are not included in concurrency requirements.

- **Golf Course** – The Fairwinds Golf Course is located on a buried former solid waste site. This area may be used for airfield facilities, such as apron, taxiways, approach lighting, etc, but not for facilities such as airport terminal or offices where people may be located for an extended period of time. Since the Golf Course does not impact proposed development in any development option considered, it can continue to operate and generate additional revenue for the Airport unless a decision is made by the BOCC to use this land for a higher or better use.
- **Temporary On-Airport Trail** – A temporary, on-airport trail was constructed within the designated 120 acre mitigation area east of Runway 28L between North 25th Street and Fairwinds Drive. This trail is located in a recorded conservation easement which was created to support construction of Runway 10L-28R and associated tree clearing necessary to maintain the ATCT line of sight requirements. This trail is a non-public and temporary trail approved by FAA which is to be used by the County's Environmental Resources Department (ERD) to allow maintenance of this area. FAA has allowed this trail with the caveat that it could be relocated if use of this area for aviation purposes is required. Since this area does support varied wildlife, a 10-foot fence between the airport operating area and mitigation area is still required.
- **Additional Non-Aviation Development** – In addition to the main airport parcel between Indrio Road and St. Lucie Blvd, FPR also owns a parcel of land between North 25th Street and US 1. A portion of this airport property (+/-19 acres), referred to as the Ridgehaven Area, was sold to the St. Lucie County Port Department as a spoil site for \$867,000 (fair market value). Still the remaining property could be utilized for industries that do not require direct access to the airfield, including the County's targeted businesses (financial institutions, biotechnology, manufacturing, etc.). Development of the remaining parcels would supplement airport revenue and therefore support airport maintenance and planned improvements.
- **Security Fencing** – Additional security fencing will be required to protect the airport operating area from unauthorized access or potential wildlife hazards since large portions of the airport property are used for conservation, mitigation, and commercial development which do not require direct access to the airfield. Security fencing will also be required in associated with the proposed non-aviation development in and



around the Airport West Commerce Park, property west of Curtis King Boulevard, the North Industrial/Commercial Park as well as development in the former Ridgehaven Subdivision.

Airport Alternative 1 – General Aviation (GA) Only /Demand Based

The Alternative One scenario maintains FPR’s current role as a general aviation airport. Therefore, **recommendations and key requirements** associated with Alternative Scenario 1 are in support of corporate, flight training, recreational, air charter (scheduled less than 9 passengers and unscheduled less than 30 passengers), limited air cargo, and aircraft maintenance and refurbishment⁴¹ operations. However, this alternative does not make provisions for unforeseen business opportunities or for increases in traffic that may exceed the master plan approved forecasts. In addition to projects identified in the Baseline Scenario (Table 5-10), the following required and recommended projects were identified for Alternative Scenario 1.

TABLE 5-12 AIRPORT ALTERNATIVE 1 PROJECTS		
Project Phase	Required	Recommended
Short-Term		Rehabilitate US Customs
		Expand Airport Administration Building
		Development of Airport West Commerce Park
Mid-Term	Strengthen Taxiway E between Taxiway A and Runway 28L (~572 linear feet)	Displace Threshold Markings Runway 32
		Expand Fuel Facilities
		Airport Drainage Improvements
Long-Term		

Source: The LPA Group Incorporated, 2009-10

Required and recommended development associated with Alternative 1 is illustrated in **Figure 5-14**. Descriptions of additional projects are provided in the following sections. It is important to note that since the airport will continue to service GA traffic, it will maintain a 40:1 departure surface clearance on Runways 10R-28L and 14-32 as shown in **Figure 5-15**.

⁴¹ Under Alternative 1, General Aviation, the airport can support refurbishment, maintenance, painting, etc. of commercial type aircraft (i.e. Canada Regional Jets, Boeing 737s, Airbus 320s, etc.) as long as the airfield (pavement strength, length, separation, etc.) can support these types of operations.



Instrument departure surface criterion is not required on Runway 10L-28R since it will remain a visual only, training runway for light aircraft of 12,500 pounds or less.

Short-Term Development

Recommended Projects

- **Rehabilitate Airport Administration Building** – The airport administration building originally designated as the airport terminal facility was constructed in 1962. The building currently houses airport staff offices and small conference room facilities. During a recent ceremony in November 2008, a pictorial history of the airport was installed within the Airport Administration Building. Because of the age of the building and St. Lucie County's active goal of encouraging green building and sustainable development, it is recommended that the building be rehabilitated and retrofitted to become more efficient and accommodate the current and long-term demands of users.
- **Rehabilitation of Customs and Border Patrol Facilities** – In 1974, FPR was designated by the US Bureau of Customs as a Landing Rights Airport and the US Border and Protection Staff were relocated to the airport. US Customs at FPR also supports the Port of Ft. Pierce, which is one of 14 deepwater seaports in the State of Florida. Although the building was recently renovated and provides approximately 8,000 SF of usable space, based upon *Airport Technical Design Standards for Passenger Processing Facilities* developed by US Customs and Border Protection, a larger building is required to meet long-term aviation demand.

As noted in **Section 4.7.2, US Customs and Border Protection**, of **Chapter 4**, 1,474 SF is required to support US Customs operations at a GA Airport. However, this number increases to 15,412 SF if commercial service occurs. However, according to US Customs, commercial service requirements are not tied to Part 121 or 139 requirements but rather are triggered in support of aircraft with twenty or more seats. Therefore, funding requests associated with the rehabilitation of the Airport Terminal and US Customs and Border Protection facilities are currently included in year 2011 of the 2009-2016 FDOT Joint Automated Capital Improvement Program.



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St. Lucie County
International Airport
Master Plan Update

Airport Alternative 1
General Aviation Development

DATE

04/25/2011

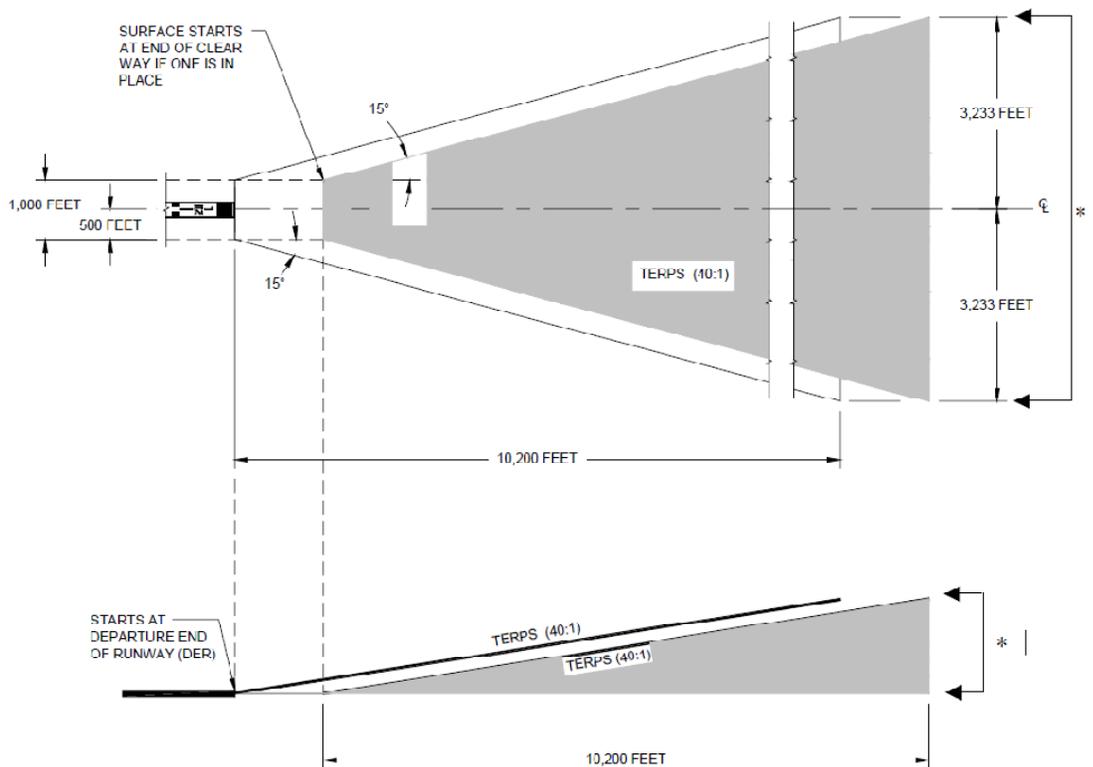
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Figure 5-15
Departure Surface for Instrument Runways TERPS⁴² (40:1)



Source: FAA Advisory Circular 150/5300-13, Airport Design, Appendix 2, 2009

Mid-Term Development

Required Projects

- **Strengthen Taxiway E** – This project focuses on strengthening the pavement between Runway 28L and Taxiway A to 90,000 lbs to accommodate anticipated corporate aviation demand. Since the majority of Taxiway D will be incorporated into the Key Air development, Taxiway E becomes the critical path for aircraft using Runway 10R-28L and the airport administration terminal apron facilities.

⁴² TERPS stands for Terminal Instrument Procedures. TERPs are used by FAA to provide a standardized method for designing instrument flight procedures. This is commonly shown in airport approach plates.



Recommended Projects

- Displace Runway 32 Landing Threshold** – Portions of the Runway 32 protection zone (RPZ) are located off of airport property, and, therefore, not controlled by the airport. It is recommended by FAA that an airport either try to acquire the property through direct purchase (fee simple) or obtain an aviation easement to maintain control. If this is not plausible, then the installation of a displaced landing threshold may be implemented. Therefore, a 790 ft displaced landing threshold was implemented on Runway 32 to encapsulate the runway protection zone within existing airport property.

Declared distance dimensions associated with the extension of Runway 14 and displaced landing threshold on Runway 32 are provided in **Table 5-13**.

TABLE 5-13 AIRFIELD ALTERNATIVE 1 DECLARED DISTANCE DIMENSIONS		
Declared Distance	Runway 14 (ft)	Runway 32 (ft)
TORA	5,700	5,700
TODA	5,700	5,700
ASDA	5,700	5,700
LDA	5,700	4,910

Source: The LPA Group Incorporated 2009

As stated in **Chapter 4** (page 4-88), **FAA Order 5100.38**, the sponsor should be strongly encouraged to acquire fee title to all land within the runway protection zone, with first priority given to land within the object free area. However, an easement, lease or restrictive covenant should be required if fee interest in a parcel is infeasible. However, if the RPZ cannot be obtained using one of these means, than the implementation of a displaced threshold could be implemented.

- Fuel Storage Expansion** – Fuel storage and distribution is predominantly provided by APP Jet Center of Ft. Pierce and Key Air Aviation fixed based operators. According to the minimum standards, “Fuel storage facility shall have total capacity for three (3) days peak supply of aviation fuel for aircraft being serviced by FBO”⁴³. In addition, Ari Ben Aviation is also equipped with fuel storage tanks but for private use only. APP Jet Center of Ft. Pierce has one 20,000-gallon Avgas tank and one 20,000-gallon Jet-A tank; Key Air has one 12,000-gallon Avgas tank and two Jet-A tanks with a total Jet-A

⁴³ St. Lucie County International Airport Minimum Standards



capacity of 24,000 gallons. Typically fuel deliveries, depending upon demand, occur on a monthly basis. Fuel storage requirements were based upon maintaining a three day supply of fuel during an average month.

TABLE 5-14 AVIATION FUEL STORAGE DEMAND AVERAGE PEAK MONTH					
Fuel Demand	Existing	Forecast			
	Storage Capacity	2013	2018	2023	2028
<i>Avgas Requirements</i>					
Total Avgas Per Day (GAL)		2,775	3,038	3,340	3,679
3 Day Reserve	32,000 gallons	8,325	9,115	10,021	11,038
<i>Jet A Requirements</i>					
Jet A Demand per Day (Gal)		5,751	7,075	8,900	11,452
3 Day Fuel Reserve	44,000 gallons	17,253	21,224	26,701	34,357
<i>Sources: APP Jet Center of Ft. Pierce and Key Air Aviation fuel records, St. Lucie County Airport Management Records, and The LPA Group Incorporated, 2009</i>					

Thus, based upon forecast demand, the current capacity can accommodate long-term demand. If an increase in heavy corporate jet occurs, however, additional Jet-A facilities or more frequent deliveries may be required.

- **Drainage and Permitting** – Any anticipated expansion of fuel facilities will require additional permitting and drainage facilities to support additional impervious surface. The displacement of Runway 32, however, has a greater impact on existing drainage facilities. Two existing drainage ponds are located southeast and southwest of Runway 32. If the runway threshold is displaced to avoid land acquisition or easement acquisition, the ponds will need to be relocated since they will impact the runway protection zone.
- **Land Acquisition and Zoning** - No additional land acquisition is required over the twenty-year planning period based upon forecast demand. However, it is recommended that if property within the existing Runway 14 departure RPZ becomes available for sale or for aviation easement then acquisition of this property rather than use of a displaced threshold is recommended.

Commercial Passenger Service

As the result of continued efforts by the St. Lucie County Tourism Board and interest by the Grand Bahamas Chamber of Commerce, the Board of County Commissioners and Airport

Management requested an evaluation of the long-term potential for regularly scheduled passenger air service and associated facility requirements at FPR. Based upon this request, three alternatives were developed: Alternatives 2A, 2B and 3.

Alternatives 2A, 2B and 3 provide alternative development recommendations related to different levels of commercial passenger service (FAR Part 139). Since at the time of this study no letters of intent had been obtained from a commercial operator, commercial enplanement and operational forecasts were not developed. Further, anticipated requirements were based upon general operator requirements and equipment.

Alternative 2A is focused on supporting potential commercial passenger service from the Caribbean and the Bahamas using turboprop passenger (e.g. Bombardier DH-8 Q300) and regional jets with passenger capacity between 9 and 50 seats as illustrated in **Figure 5-16**.

Figure 5-16
Bombardier DH-8 Q300



Source: Google Images, Seabee.info, 2009

The Bombardier DH-8 has an ARC of B-III and is equipped with 50 passenger seats. The aircraft has a dual wheel landing configuration, maximum takeoff weight of 43,000 pounds, and a regulatory operating field length⁴⁴ of 4,541 feet based upon FPR’s operating conditions.

The Bombardier DH-8 was chosen as the commercial critical aircraft for this alternative since it is currently being used by Bahamasair. Although no discussions have occurred at the time

⁴⁴ Aircraft operating under FAR 121, 135 and 380 must be able to land within 60 percent of the usable runway pavement at maximum landing weight, maximum mean temperature and under dry or wet pavement conditions. The regulatory operating field length is the longest length necessary for the aircraft to operate at a specific airport. This length can either be the takeoff or landing length, whichever is greater.

of this writing with the carrier regarding commercial operations at FPR, this aircraft was considered a likely candidate for the initiation of commercial (Part 121) service at FPR within the next five to ten years.

Alternative 2B represents the next level of commercial passenger service with the introduction of larger (90 seat) regional jets (e.g. Canadair Regional Jet 900ER) and expanded service throughout the southeast as well as to destinations in the Northeast and Midwest. It was anticipated that regional jet operations would reflect a code sharing agreement with the legacy carriers, such as Delta, American, USAir, etc. Thus, under the air carriers Part 121 certification, airport facility requirements may be more stringent. The type and level of airport facilities is specific to the carrier and is above and beyond typical FAR Part 139 commercial airport requirements. To determine airfield and commercial requirements, the Canadair Regional Jet (CRJ) 900ER, **Figure 5-17**, was chosen as the critical aircraft because of its popularity within the commercial air carrier fleet.

Figure 5-17
Canadair Regional Jet - 900ER



Source: America West Express, 2008

The CRJ-900ER is designated as an ARC C-III, like the Gulfstream 550, and has a dual wheel landing gear and maximum takeoff weight of 82,500 pounds. Based upon the aircraft's operating requirements at FPR (elevation, mean maximum temperature, runway gradient, etc.), takeoff length requirements at 90 percent load factor was 5,570 feet while calculated regulatory landing field length for 14 CFR Part 121, 135 and 380 operators is 6,054 feet (dry pavement conditions) and 6,962 feet (wet pavement conditions). As a result, this aircraft

under most operating conditions can operate at FPR at its current runway length of 6,492 feet. However, the pavement strength will need to increase in support of repeated operations by this aircraft, the Gulfstream 550, and other similar aircraft.

Alternative 3, *Air Carrier Passenger Service*, is the next level of passenger service similar to operations and services provided at Ft. Lauderdale International and West Palm Beach International Airports. Under this scenario, the airport would support legacy carrier operations nationally and internationally. This alternative is designed to support aircraft with passenger seats up to 189 seats (Boeing 737-800) as illustrated in **Figure 5-18**.

Figure 5-18
Boeing 737-800



Source: Google Images, Airspotter.com

The B737-800 is equipped with 162 to 189 seats, has a maximum takeoff weight of 174,200 pound, dual wheel landing gear and a regulatory field length requirement of 8,150 feet at 89 degrees Fahrenheit. Although a much larger commercial aircraft than those identified in Alternatives 2A and 2B, the airport, with the exception of runway length and pavement strength, currently meets a number of the design requirements necessary to accommodate this aircraft including runway-taxiway separation, runway width, and in some cases taxiway width.

However, as mentioned in **Section 5.5.6**, several administrative and operational requirements as outlined in an approved Airport Certification Manual, Airport Emergency Plan and Wildlife Hazard Management document as well as Airport Security Manual must be implemented prior to the Airport Regional Certification Office’s inspection and certification.



Because Alternatives 2A, 2B and 3 support some level of commercial passenger service, specific projects in addition to the Baseline Projects listed in **Table 5-10** will be required for all three scenarios. **Table 5-15** identifies additional required and recommended projects.

TABLE 5-15 BASELINE COMMERCIAL PASSENGER DEVELOPMENT PROJECTS		
Phase	Required Projects	Recommended Projects
Short-Term Development	Retrofit Airport Administration to Commercial Terminal	Install Distance to Go, Runway, Taxiway and Apron Identification and hold signs – Alternative 2A and 2B
	Expand US Customs and Border Protection Facilities	Install Perimeter Service Road
	Reconfigure Terminal Automobile Parking	Lighting improvements - Taxiways A, B, C & E - Part 139 (Alternative 2A & 2B):
	Install High Intensity Rotating Beacon	Taxiway Centerline Reflectors
	Implement 62.5 departure surface requirements on Runways 10R-28L	Clearance Bar Lights
	Expand Electrical Vault	Stop Bar Lights
	Install Distance to Go, Runway, Taxiway and Apron Identification and hold signs – Alternative 3	Runway Guard Lights at each intersection with Runway 10R-28L
	Implement 62.5 Departure Surface on Runway 28L	Install additional lighted wind cone – Alt 2A & 2B
	Lighting improvements - Taxiways A, B, C & E - Part 139 (Alternative 3):	
	Taxiway Centerline Reflectors	
	Clearance Bar Lights	
	Stop Bar Lights	
	Runway Guard Lights at each intersection with Runway 10R-28L	
Install additional lighted wind cone – Alt 3		
Mid-Term Development	Extend Taxiway D to Runway 28L Threshold	Remove Taxiway E between Runway 28L and Taxiway A
	Additional Security Fencing, Markings and Surveillance	Construct West GA Apron (~2500 SY)
	Segregation of Security Identification Area (SIDA) within the Airport Operating Area	Extend Taxiway A west to Airport West Commerce Park
Source: The LPA Group Incorporated, 2009-2010		



Short-Term Development

Required Projects

- **Retrofit and Expand Airport Administration Building** – In order to accommodate limited commuter service at FPR, the existing Airport Administration Building adjacent to US Customs and Border Protection Facility should be retrofitted to accommodate commercial service requirements. As a result, the St. Lucie BOCC and Tourism Board requested preliminary designs for commercial terminal development.

Using FAA terminal area requirements (FAA AC 150/5360-13, *Planning and Design Guidelines for Terminal Facilities*), as outlined in **Table 5-16**, two alternative options were developed. **Tables 5-17 and 18** and **Figures 5-19 and 20**, respectively, illustrate two preliminary layouts associated with retrofitting the existing Airport Administration Building to accommodate limited commercial service.

TABLE 5-16 TERMINAL OPTION 1	
Facilities	Standard FAA Requirements
Space Behind Ticket Counter	8 ft to 10 ft Typical
Queuing Depth at Ticket Counter	12 ft to 15 ft Typical
Minimum Circulation Depth in Lobby Behind Ticket Counter Queuing	20 ft Minimum
Queuing Square Footage for 50 Passengers Behind Ticket Counter	750 SF Recommended
Square Footage for 50 Passengers in Lobby	1,000 SF Recommended
Square Footage for 50 Passenger in Hold Room	538 SF Recommended
<i>Sources: FAA Advisory Circular 150/5 Non-Hub Terminal Requirements and The LPA Group Incorporated, 2009</i>	

TABLE 5-17 OPTION 1 TERMINAL SPACE REQUIREMENTS	
Facilities	AREA (SF)
Existing Terminal Area	3,504
Additional Area Required	3,729
Airside Covered Entry	193
Landside Curve Side	731
Baggage Makeup	275
Total Terminal Facilities	8,432
Source: The LPA Group Incorporated, 2009	

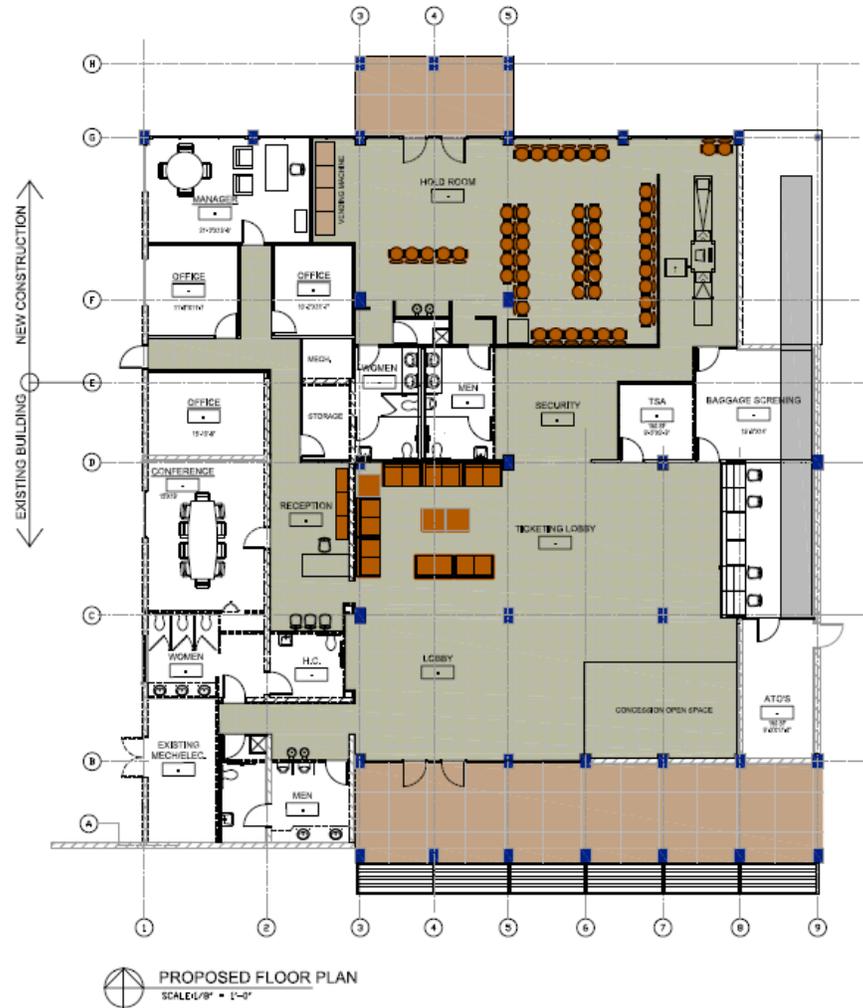


TABLE 5-18 OPTION 2 TERMINAL SPACE REQUIREMENTS	
Facilities	AREA (SF)
Existing Terminal Area	3,504
Additional Area Required	3,377
Airside Covered Entry	193
Landside Curve Side	838
Baggage Makeup	175
Total Terminal Facilities	8,047
Source: The LPA Group Incorporated, 2009	

As a result of discussions with Airport Management, a modified version of Terminal Alternative 1 was chosen as the preferred development (**Figure 5-21**). As part of the terminal development concept, clerestory windows (skylights) have already been incorporated into the roof design. The use of underground cisterns to capture rainwater from the roofs of both the Terminal and US Border and Customs facilities is also being evaluated to determine if the cost is worth the benefits.

In addition, based upon the type and level of demand, the client and architects in coordination with the US Customs and Border Protection Facilities Director are evaluating the potential of connecting the retrofitted terminal to US Customs facilities on the airport. At the time of this writing, LPA architects are coordinating proposed terminal development with the Transportation Security Administration and US Customs and Border Patrol personnel to determine requirements based upon potential commercial aviation demand.

Figure 5-19
Terminal Option 1



1 SOUTH ELEVATION
SCALE 1/8" = 1'-0"

Source: The LPA Group Incorporated, 2009

Figure 5-20
Terminal Option 2
Elevations



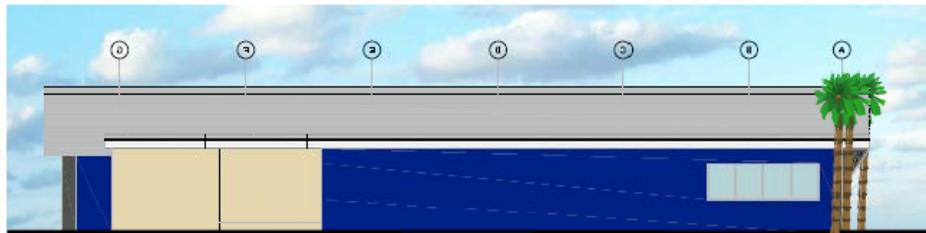
1 SOUTH ELEVATION
 SCALE: 1/8" = 1'-0"



2 EAST ELEVATION
 SCALE: 1/8" = 1'-0"

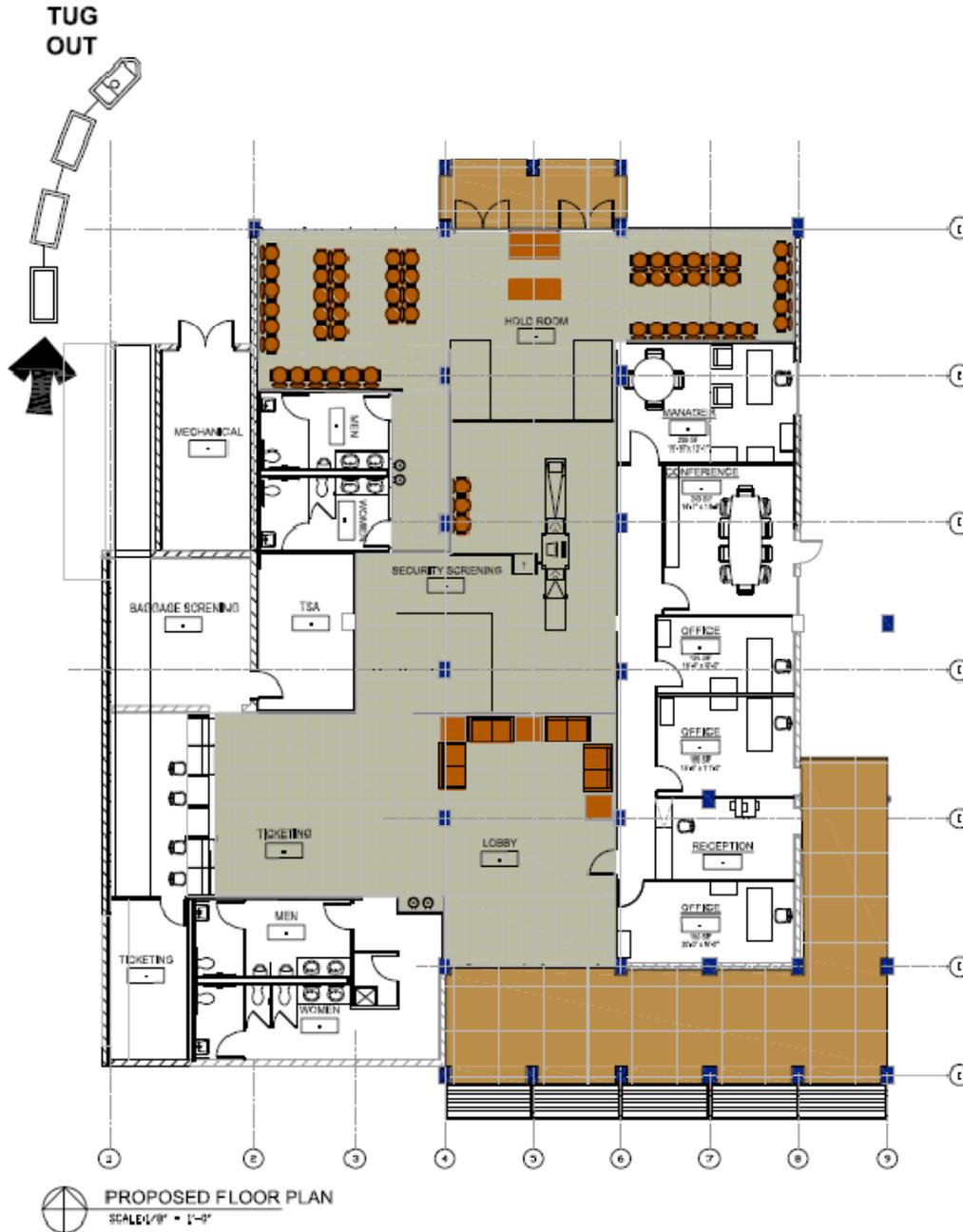


3 NORTH ELEVATION
 SCALE: 1/8" = 1'-0"



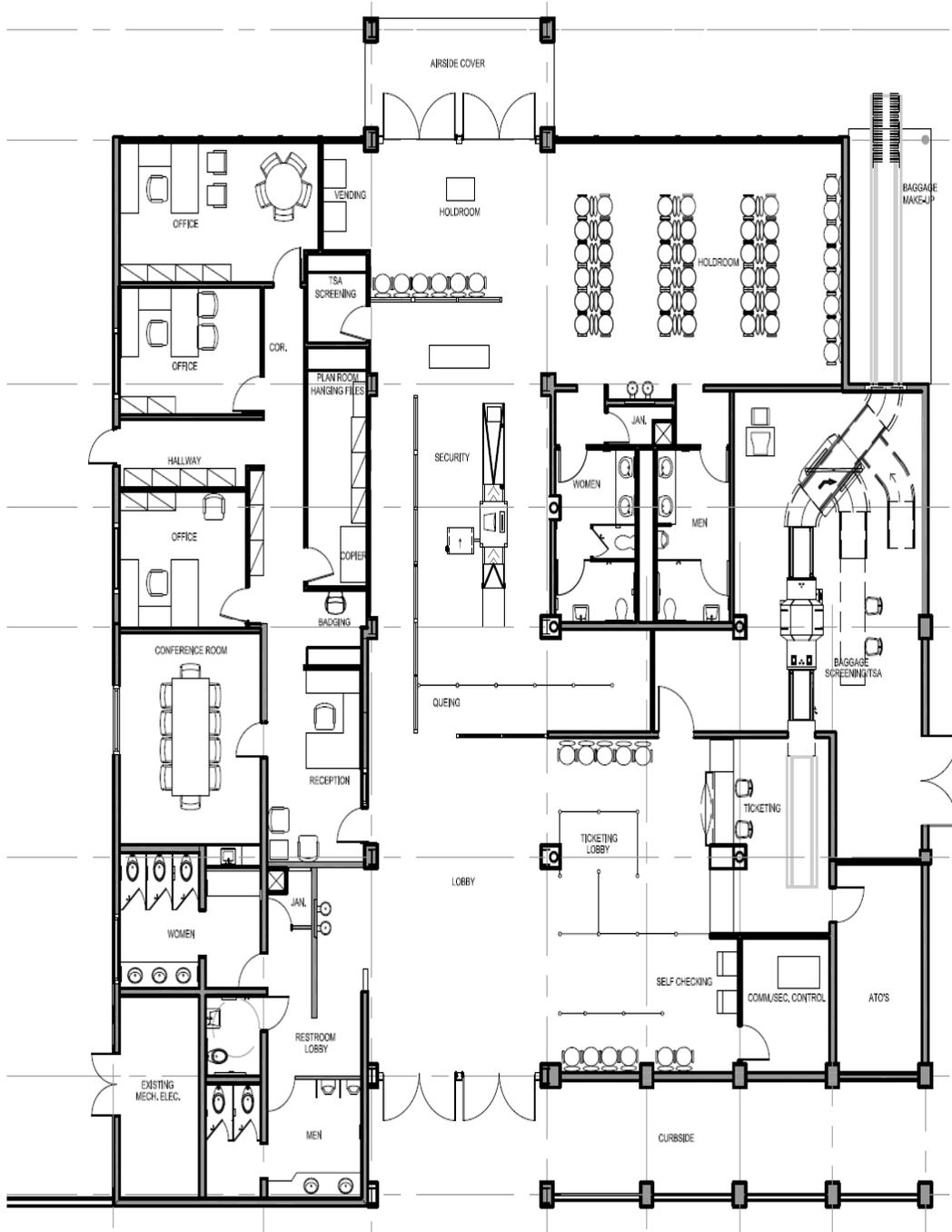
4 WEST ELEVATION
 SCALE: 1/8" = 1'-0"

Figure 5-20
Terminal Option 2 (Con't)
Floor Plan



Source: The LPA Group Incorporated, 2009

**Figure 5-21 Preferred Alternative/Modified Terminal Option 1
Floor Plan**



Source: The LPA Group Incorporated, 2010



- **Expand US Border and Customs Protection Facilities** – As mentioned in Alternative 1, the existing US Customs and Border Protection Facility needs to be upgraded/expanded to accommodate not only expected commercial air carrier demands but also to support continued growth of the Port of Ft. Pierce. According to US CBP sizing requirements (Chapter 4), minimum space requirements are 15,412 SF. Therefore, the current 8,000 SF building would need to be expanded. Also because US Customs is located adjacent to the Airport Administration Offices, discussions are being held to potentially connect the two buildings to facilitate the flow of commercial traffic. However, it should be noted that if international passengers, such as those from the Bahamas, are pre-screened, they will not be required to be re-screened at FPR. In addition although sterile facilities cannot be shared, discussions are being held with the US Customs Miami Field Office Facilities Director and West Palm Transportation Security Administration (TSA) to determine if non-sterile facilities such as office space and/or break rooms can be shared. If this is determined by both agencies as acceptable, than a two story joint use facility is recommended.
- **Reconfigure Terminal Automobile Parking** – As part of the terminal and US Customs expansion and reconfiguration projects, existing landside access and automobile parking will need to also be reconfigured to accommodate the type and level of user demand. Two landside parking and access options were developed, and are illustrated in **Figures 5-22 and 5-23**. Both options do not require any expansion of the existing pavement area, and, therefore, impacts to drainage and wildlife are minimized.
- **Upgrade Fencing** – As noted in Alternatives 1 and 2, additional fencing and access control facilities will need to be installed to avoid unauthorized access from wildlife and individuals which could threaten the safety of airport users and aircraft operations. Fencing between the non-aviation portions of the airfield and Airport Operating Area prevent impacts to aviation.
- **Upgrade to High-Intensity Airport Rotating Beacon** – Upgrading the existing airport beacon to a high intensity beacon will assist operators in locating the airport during low light or nighttime conditions. A high intensity beacon is also recommended for airports serving commercial traffic.

**Figure 5-22
Terminal Parking Option 1**



Source: The LPA Group Incorporated, 2009

**Figure 5-23
Terminal Parking Option 2**

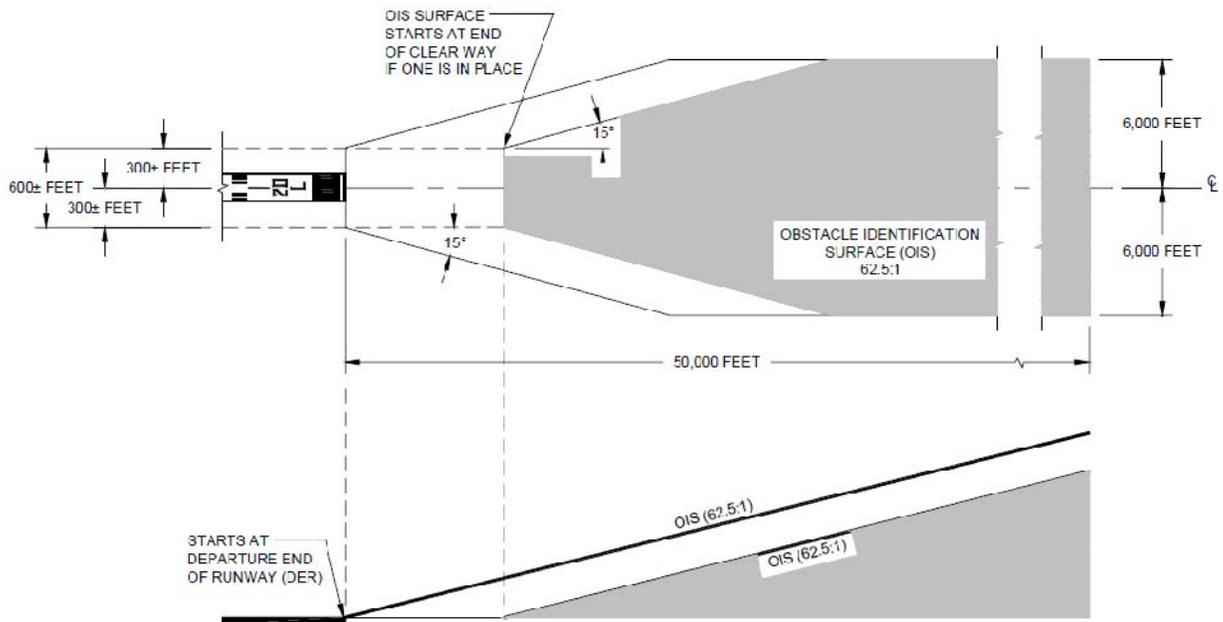


Source: The LPA Group Incorporated, 2009

- Implement 62.5 departure surface requirements on Runways 10R-28L** – The current departure surface requirement for general aviation and commercial service airports supporting instrument departures is based upon a 40:1 departure slope as illustrated in **Figure 5-15**. However, according to **FAA AC 150/5300-13**, Appendix 2, departure runway ends supporting Air Carrier operations must be based upon a 62.5:1 departure slope and must extend for a length of 50,000 feet as shown in **Figure 5-24**. According to discussions with FAA Flight Standards, FAA intends to implement this departure surface requirement as of 2010 and will then be reevaluating existing commercial airport departure procedures. Although portions of the Airport West Commerce Park are currently located within the departure surface of Runway 28L, anticipated development, with the exception of potential height restrictions, is expected to be unaffected. For any planned airport development, whether aviation or non-aviation related, the airport or developer should submit a notice of proposed construction to FAA to obtain a determination of no hazard to air navigation, thereby avoiding potential issues in the future.

Note: Runway 14-32 will continue to support general aviation only, and, therefore, the departure surface will remain at 40:1 as illustrated in **Figure 5-15**.

Figure 5-24
One-Engine Inoperative (OEI) Obstacle Identification Surface (62.5:1)



Source: FAA Advisory Circular 150/5300-13, Airport Design, Appendix 2, 2009



- **Expand Electrical Vault** - The electrical vault has recently been expanded to accommodate various lighting improvements on the airport. However, as the airport adds additional navigational aids and lighting, the need for a newer and larger facility dedicated to housing airfield electrical equipment will be needed. The time frame for a new vault is dependent upon the rate of airfield improvements, and should be constructed in conjunction with a major airfield electrical improvement project. It is suggested that expansion of the existing vault would likely occur in the short/mid-term in conjunction with planned runway improvements; whereas an additional vault would be required beyond the twenty-year planning period to support additional improvements.

Required (Alternative 3)/Recommended (Alternatives 2A and 2B) Projects

- **Construct Airport Perimeter Road** – A partial perimeter road currently exists parallel to Taylor Dairy Road. However, as noted under Commercial Requirements, an internal perimeter road should be constructed to allow operations to conduct inspections of airport facilities while monitoring potential threats. The perimeter road may be constructed of a permeable service, but must be able to accommodate operational and emergency vehicles.
- **Install Signage** – Install taxi route signs, holding position signs, instrument landing system critical areas signs, and distance to go signage to identify movement areas. Further all signage must be internally illuminated to assist users during low light or night conditions.
- **Upgrade Runway and Taxiway Markings** – Reflective runway pavement markings must be installed to meet the specifications for takeoff and landing minimums for each runway. Runway 10R-28L is designed to accommodate a Category I precision approach, Runway 14-32 will continue to provide non-precision approach capability while Runway 10L-28R will provide only basic markings to accommodate training operations. In addition to runway markings, taxiway centerline, edge, holding position, precision obstacle free zone (POFZ) and the ILS critical area markings are necessary to accommodate anticipated commercial aircraft operations on Runway 10R-28L.
- **Taxiway Lighting Requirements and Recommendations (Twys A, B, C, D and E)**
In support of commercial aircraft operations, some taxiway lighting improvements are required and some are recommended. Required lighting improvements are listed in **Table 5-7** and include the addition of centerline pavement reflectors and reflectors for holding position lines.



However, if the airport is going to support commercial service during night time or low-light conditions, the following taxiway lighting is recommended according 14 CFR Part 139 but not required:

- Clearance bar lights (three in-pavement steady burning yellow lights), to designate aircraft holding position
 - Stop bar lights (red, unidirectional in-pavement lights) used to provide ATC clearance to enter or cross an active runway, and
 - Runway guard lights which are used to designate taxiway/runway intersections and may consist of either a pair of elevated flashing yellow lights installed on either side of the taxiway or a row of in-pavement yellow lights installed across the entire runway at the runway holding position markings.⁴⁵
- **Obstruction Lighting** – Objects which cannot be removed, lowered or relocated within the FAR Part 77 surfaces that have been determined by FAA as **not** a hazard to air navigation must be lit with a red light to designate their location in relation to the runway thereby alerting approaching or departing aircraft.
 - **Install Taxiway and Distance to Go Signage** – In addition to signage improvements recommended for Runways 10R-28L and 14-32, distance to go, identification and guidance signage is recommended on Runway 10L-28R and associated taxiways in conjunction with the proposed extension.
 - **Install Runway Centerline Lighting System** – Since Runway 10R-28L is designed to accommodate commercial operations associated with air carrier aircraft with greater than 30 seats, in-pavement runway centerline lights should be installed at 50 foot intervals. When viewed from the landing threshold, the runway centerline lights are white until the last 3,000 feet of the runway. From there, the white lights alternate with red for the next 2,000 feet, and for the last 1,000 feet of pavement the centerline lights are all red.
 - **Install Taxiway Centerline Lights** – As required under FAR Part 139, medium intensity taxiway centerline lights should be installed on Taxiways A, the proposed connector taxiway, parallel taxiway north of Runway 10R-28L as well as the North-South Connector Taxiway.
 - **Install Taxiway Centerline Lead on and Lead Off Lights** – Taxiway Centerline Lead On and Off lights are used to provide visual guidance to persons entering or exiting an instrument runway. These runways are color-coded to warn pilots and vehicle drivers that they are within the runway environment or ILS critical area.

⁴⁵ FAA Air Traffic publications Aeronautical Information Manual, Chapter 2 Aeronautical Lighting and Other Airport Visual Aids



- **Install Runway Entrance Lights (RELs)** - The REL system is composed of flush mounted, in-pavement unidirectional figures that run parallel to and along the taxiway centerline. These lights direct the pilot at the hold line. The REL starts at the hold line and consists of a series of evenly spaced lights to the runway edge. When activated, these red lights indicate that there is high speed traffic on the runway or there is an aircraft on final approach within the activation area.⁴⁶
- **Install Lighted Wind Cones** - Lighted wind cones should be located to allow easy visual reference from any runway end, and must provide a constant brightness to the pilot. Because of the distance between Runways 10R-28L and 10L-28R, it is recommended that additional 8 to 12 foot lighted wind cones be installed near the thresholds of each runway end.

Mid-Term Development

Required Projects

- **Extend Taxiway D** – With the partial removal of Taxiway E, construction of a new 90 degree connector taxiway which can provide access to Runway 28L threshold is recommended. This allows aircraft operating on Runway 10R-28L better visibility while limiting the potential for runway incursions.
- **Segregation of Security Identification Area (SIDA) within the Airport Operating Area** – Additional surveillance and controls are required to maintain the security of operations on the commercial terminal apron and on other critical areas of the airport. A badging system which limits access to certain areas of the airport is required in conjunction with both FAA Part 139 and TSA requirements. The perimeter of the SIDA should be clearly marked and limited to specific operations.
- **Installation of security fencing, surveillance and emergency control room, etc.** – Portions of the airport property and airfield are accessible to persons, vehicles and animals. Therefore, additional fencing will be required in conjunction with planned development and for the protection of the SIDA and AOA. In addition, the installation of surveillance equipment and an emergency control room to monitor critical areas and facilities such as the SIDA, Fuel Facilities, Terminal, etc. should be installed either within a sterile area of the passenger terminal facilities or possibly within the satellite ARFF building.

⁴⁶ FAA Airport Instruction Manual, Chapter 2, Aeronautical lighting and other airport visual aids.



Recommended Projects

- **Remove Portion of Taxiway E** - A portion of Taxiway E which is currently 50 feet wide is located between Taxiway A and Runway 28L. Since Runway 10R-28L is expected to accommodate ARC C-III aircraft, the taxiway width requirement is 50 feet. Also, as mentioned in previous master plan updates, the current angle of Taxiway E limits its use by aircraft operating on Runway 10R-28L. Therefore, it is recommended that this portion of Taxiway E be removed.
- **West GA Apron** – With acquisition of property and the construction of the training runway, it is recommended that initially a 2,500 SY apron be constructed south of Runway 10L-28R and its parallel taxiway. The remainder of the property would be reserved for future development. Development of this area will likely require a relocation or culvert of the existing drainage canal and wetland mitigation.
- **Extend Taxiway A to Commerce Park** – In conjunction with commerce park development, an extension of Taxiway A including a run-up pad to the south is recommended thereby providing airfield access to potential commerce park users. This also allows airport management flexibility related to development of the commerce park west of the airfield. Added MITL, signage and associated markings in conjunction with FAA design criteria is also included as part of the proposed development.

Recommended development associated with Alternatives 2A, 2B and 3 is provided in the following sections. A comparison matrix of airport development options 1, 2A, 2B and 3 is provided in **Section 5.9**. The preferred airport growth, which may consist of a combination of alternatives presented in this chapter, is based upon input from the general public, airport tenants, technical advisory committee and Board of County Commissioners and presented in **Chapter 6** of this report.

Airport Alternative 2A – Limited Commercial Passenger Service

Alternative 2A assumed that FPR would continue to support general aviation operations, including fractional ownership and on-demand air taxi operations, as well as limited Part 121 operators associated with an operator similar in size to Bahamasair. Required and recommended projects specific to Alternative 2A are outlined in **Table 5-19** and development is illustrated in **Figure 5-25**.



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TABLE 5-19 AIRPORT ALTERNATIVE 2A PROJECTS		
Project Phase	Required	Recommended
Short-Term		Acquire Property within Runway 32 Easement
Mid-Term		Extend Taxiway C
		Construct Holding Pad - Taxiway C
		Environmental & Permitting
		Airport Drainage Improvements
		Expand Fuel Facilities (30,000 gallons)
Long-Term		Expand West GA Apron (5,000 SY)
		Construct North Taxiway on former North South Runway
		Reconstruct North Taxiway on Former North South Taxiway
		Construct North Central GA Apron (5,000 SY)
<i>Source: The LPA Group Incorporated, 2009-10</i>		

Short-Term Development

Recommended Projects

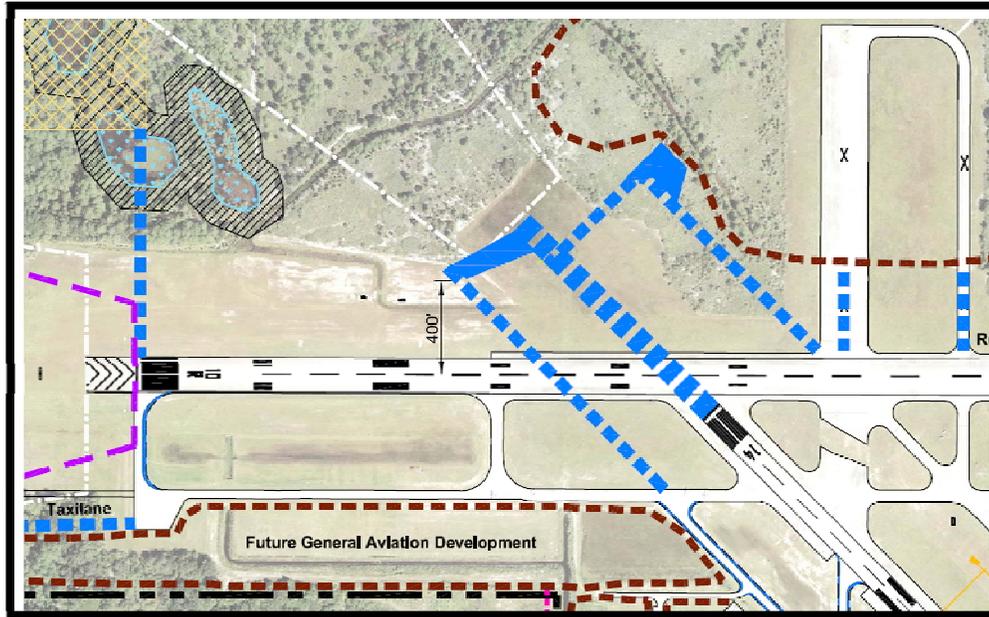
- **Acquire Property within Runway 32 Easement** – As recommended in FAA AC 150/5300-13, airports are encouraged to maintain control of property within the runway protection zones. This is to avoid the potential for development of incompatible land use. In the case of FPR, portions of the secondary RPZ surface are outside the current airport property line, and a building has already been constructed. In order to avoid further impacts to the approach and departure surface of Runway 14 and 32, it is recommended that the County either purchase the property outright or obtain an aviation easement. If neither option can be obtained, management can request a modification to standards otherwise FAA may require that the threshold to Runway 32 be relocated to shift the entire RPZ onto airport property.

Mid-Term Development

Recommended Projects

- **Extend Taxiway C and add Holding Pad**– In order to provide access to APP Jet Center of Ft. Pierce’s facilities and limit runway crossings, an extension of Taxiway C is recommended. This extension would include the construction of a holding pad north and west of the Runway 14 threshold outside the Runway 10R-28L and 14-32 object free areas in order to allow aircraft to hold without being in the visual approach of incoming aircraft as illustrated in **Figure 5-26**.

**Figure 5-26
Taxiway C Extension**



Source: The LPA Group Incorporated, 2009

- **Environmental & Permitting Requirements** – In conjunction with planned improvements especially on the northwest side of the airfield related to taxiway and apron construction, environmental studies including potential tree and wetland mitigation and associated permitting needs to be completed before design or construction may begin.
- **Airport Drainage Improvements** – Further with increased impervious surface and potential impacts to existing drainage areas and wetlands, additional storm water drainage discharge facilities will need to be constructed or realigned to accommodate airfield development over the twenty-year planning period.
- **Expand Fuel Farm** – Aircraft fueling at FPR is currently conducted by the two FBOs, Key Air and APP Jet Center of Ft. Pierce. However, with additional demand associated with increased corporate and potential commercial operations, it is anticipated that the current two week peak storage requirement for Jet A will need to increase to approximately 45,000 gallons. Expansion of existing fuel facilities will require permitting and potentially drainage improvements depending upon the location and size of the facilities.



Long-Term Development

Recommended

- **Expand West GA Apron** – As part of long-term general aviation use of Runway 10L-28R, additional facilities will be required to accommodate demand. Thus, depending upon demand, the West GA Apron south of Runway 10L-28R adjacent to Taxiway “F” would be expanded to provide a minimum of 5,000 square yards of available pavement.
- **Construct North Central Apron** - Construction of an additional ARFF facility is recommended north of Runway 10R-28L. However, it is also recommended that a GA apron west of the North-South Taxiway and adjacent to the satellite ARFF facilities be constructed. It is area could include hangars and approximately 3,000 SY of apron space.
- **Construct New North Taxiway and Reconstruct Existing North Taxiway** – Portions of the old Runway 18-36 and associated taxiway still exist on the north side of the airfield. Based upon the recommendation to develop general aviation and aircraft rescue facilities between the extended Taxiway B to the west and the Golf Course to the east, new taxiway access is required. Thus, reuse and reconfiguration of existing pavement to provide two-way taxiway access is recommended.

Alternative 2B - Regional Commercial Passenger Service

Alternative 2B assumed that the next level of commercial aircraft operations at FPR would be regional service by commuter/regional affiliate air carriers. These operators typically support the legacy carriers (i.e. Delta, American, etc.) and utilize a range of turboprop (i.e. DH-8 300 and 400) and regional jet aircraft such as the Canada Regional Jet (CRJ) 100/200 (50 seats), CRJ-700 (70 seat), and CRJ-900 (86-90 seats) aircraft. The critical aircraft used to identify facility requirements in Alternative 2B was the CRJ-900ER as illustrated in **Figure 5-17** and the Gulfstream 550. An illustration of recommended development under Alternative Scenario 2B is provided in **Figure 5-27**.

Key differences between Alternatives 2A and 2B include visibility minimums, aircraft size and associated ARFF requirements. By lowering the visibility minimum from $\frac{3}{4}$ statute mile to $\frac{1}{2}$ statute mile, the FPL power lines which are located on the west side of the airport property would need to be relocated to Seminole Road. Further, the approach lighting on Runway 10R would be upgraded from ODALs to a MALSR (medium intensity approach lighting with runway approach indicator lights (a series of strobe lights which direct aircraft to the centerline of the runway)), and runway edge lighting on Runway 10R-28L would be upgraded from medium intensity to high intensity. Lastly a transmissometer antenna (runway visibility



range (RVR) antenna) would be installed near the glide slope antenna to provide an accurate measurement of aircraft visibility associated with the instrument approach.

Another key difference concerns the size (primarily the length of the fuselage) of the critical passenger aircraft and aircraft rescue and firefighting requirements. FPR is currently equipped to accommodate ARFF Index “A” aircraft, defined as aircraft less than 90 feet in length. However, the CRJ-900 is approximately 119 feet, which increases the ARFF requirements to an Index B. As a result, an additional fire rescue vehicle and extinguishing agent⁴⁷ is required.

Other projects associated with Alternative 2B include installation of a segmented circle near Runway 10L-28R, extending Taxiway A-3, constructing a new north-south taxiway connection to provide access to Runway 10L-28R, and expanding the fuel farm to accommodate 45,000 gallons of Jet A. A list of required and recommended projects is provided in **Table 5-20**, and a comparison of Alternative 2A and 2B projects is provided in **Table 5-21**.

⁴⁷ One vehicle carrying the extinguishing agents as specified for Index A; and one vehicle carrying an amount of water and the commensurate quantity of AFFF so the total quantity of water for foam production carried by both vehicles is at least 1,500 gallons. (ARFF Requirements, FAR Part 139)



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TABLE 5-20 AIRPORT ALTERNATIVE 2B PROJECTS		
Project Phase	Required	Recommended
Short-Term		Acquire Runway 14-32 RPZ Easement
		Additional Segmented Circle - Adjacent to Training Runway
Mid-Term	Environmental & Permitting	Expand Fuel Facilities (45,000 gallons)
	Acquire Easement/Property - Runway 32 RPZ	Remove Taxiway E between Runway 28L and Taxiway A
	Additional ARFF Vehicle and Extinguishing Agent	Construct West GA Apron (~2500 SY)
	Relocate FPL Power Lines - Estimate	Extend Taxiway A-3 North to Connect with Runway 14 Threshold
		Construct Holding Pad (Taxiway A-3 and Runway 14)
		Environmental & Permitting
		Airport Drainage Improvements
Long-Term	Install MALSR - Runway 10R	Expand West GA Apron (5,000 SY)
	Upgrade MIRLs to HIRLs on Runway 10R-28L	Install North South Connecting Taxiway
	Install RVR Sensor/Transmissometer	Environmental and Permitting
		Estimated Drainage Costs

Source: The LPA Group Incorporated, 2009-10

TABLE 5-21 ALTERNATIVE 2A AND 2B COMPARISON		
Operational Standards and Facility Requirements	Alternative 2A	Alternative 2B
Visibility Approach Minima Runway 10R	¾ statute mile	½ statute mile
Relocate FPL Power Lines	No	Yes
Upgrade Runway 10R-28L Edge Lighting	No	Yes
Runway 10R Approach Lighting Requirements	ODALs/MALS	Medium-Intensity Approach Lighting System with Runway Alignment Indicator (MALSR)
Install Additional Segmented Circle adjacent to Runway 10L-28R	No	Yes
ARFF Index*	Index A	Index B
Expand Fuel Facilities	30,000 gallons	45,000 gallons
Taxiway Improvements	Extend Taxiway C	Extend Taxiway A-3

Notes: * Based upon the length of the aircraft which performs 5 or more daily operations.
Source: The LPA Group Incorporated, 2009



Short-Term Development

Recommended Projects

- **Acquire easement/property Runway 32 RPZ** – FAA recommends that airports control either through fee simple acquisition or easement property located within the runway protection zone to limit potential incompatible land use. In both Alternatives 2A and 2B, a portion of the Runway 32 approach RPZ is located outside the existing airport property boundary. According to County zoning information, the off-airport property is currently zoned industrial. It is, therefore, recommended that county management pursue easement agreements with the existing land owners to maintain compatible land use.
- **Install Additional Segmented Circle** – Because of designated traffic patterns on Runways 10L-28R and 10R-28L, the distance from the existing or proposed relocated segmented circle, and the primary use of Runway 10L-28R as a training runway, an additional segmented circle adjacent to Runway 10L-28R is recommended.

Mid-Term Development

Required Projects

- **Environmental, Permitting and Drainage**–Required and recommended airfield and landside improvement could impact existing wetlands, protected species and drainage facilities on the airport. As a result, mitigation, permitting and reconfiguration of existing facilities will be required to accommodate planned development.
- **Acquire additional ARFF Equipment** – As stated earlier, an additional fire response truck and extinguishing agent will be required to support Index B commercial operations.
- **Relocate FPL Power Lines** - Since the 1983 master plan update, it was recommended that the Florida Power and Light (FPL) power lines adjacent to Taylor Dairy Road be relocated west of King's Highway. This was based upon previous recommendations to extend the runway and to buy property west of King's Highway for a right-of-way. Although an extension of either 10R-28L or 10L-28R is neither recommended nor required as part of Alternative 2B, relocation of the power lines would allow the airport the ability to lower its visibility minima on Runway 10R to ½ statute mile with the installation of a MALSR (medium intensity approach lighting system with runway alignment indicator lights), HIRLs (high intensity runway edge lights) and RVR (runway visibility range). In addition, it may increase the use of Runway 10L-28R at night because, according to FAA ATC personnel, some pilots are uncomfortable using the training runway at night due to the proximity of the power lines and current lack of approach lighting.

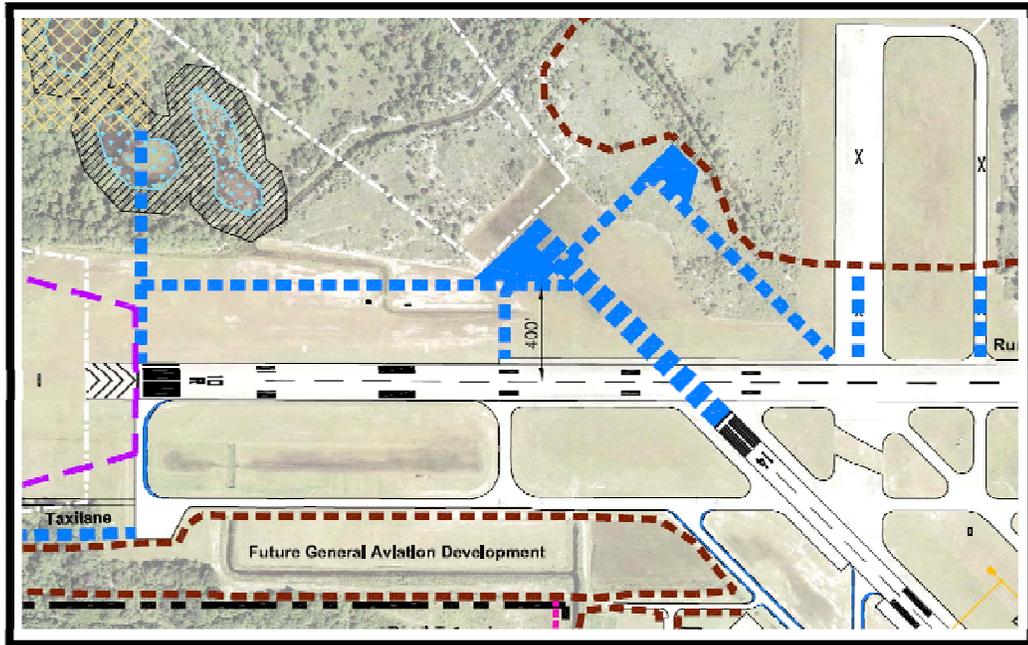


Although a ½-statute mile approach is not required to support commercial operations, some aircraft operators may prefer to operate at airports which do provide such minimums. Thus, in order to provide FPR the greatest flexibility for future development, it is recommended that the BOCC consider the potential of relocating the power transmission lines to the west side of Seminole Road. Although the County would need to acquire property for the utilities right of way, based upon discussions with St. Lucie County Transportation Planning and Planning and Development Services Departments, such a relocation would not only support the airport but planned long-term (50-years) expansion and growth within the County.

Recommended Projects

- **Extend Taxiway A west** – As in Alternative 2A, it is suggested to extend Taxiway A to the west to provide access to the west commerce park, and to provide airfield access for potential general aviation between the fenceline to the east and extended Taxiway.
- **Remove portion of Taxiway E** – With the recommended extension of Taxiway D to the threshold of Runway 28L, the portion of Taxiway E, which is 35 feet in width, between Taxiway A and Runway 28L would be removed to avoid a multiple entry intersection to Runway 28L.
- **Construct West GA Apron**-As stated in Alternative 2A, construction of a small (approximately 2,500 square yards) apron south of Taxiway F would facilitate the use of training operations on Runway 10L-28R.
- **Extend Taxiway A-3 and Construct Run-up Pad** – In conjunction with the recommended extension of Runway 14-32 to the northwest and construction of a north parallel taxiway to Runway 10R, another option to provide connectivity to the west side of the airfield is through an extension of current Taxiway A-3 to the north as illustrated in **Figure 5-28**. Further in order to avoid potential runway incursions or obstructions to approaching aircraft pilot's sight line, a run-up/holding pad should be constructed north and west of the Runway 14 threshold marked with a holding line outside the runway safety area. This option was developed in an effort to limit aircraft runway crossings and to provide access to FBO and hangar facilities on the west side of the airfield.

Figure 5-28
Taxiway Option 2



Source: The LPA Group Incorporated, 2009

- Environmental, Drainage and Project Permitting Requirements** – All required and recommended projects will need to consider environmental impacts, drainage requirements and permitting. The airport property has numerous mitigation areas for wetlands, trees, scrub jays and gopher tortoises as well as a variety of open drainage swales and ponds. Any additional development especially related to impervious pavement will require some level of permitting and mitigation.
- Expand Fuel Facilities** – With increased demand by commercial aircraft operations, fuel storage facilities will need to be increased to accommodate peak period demand. It is estimated that Jet A fuel requirements would need to be increased to approximately 45,000 to accommodate the 3-day peak period requirement. However, since a forecast of commercial passenger operations was not developed as part of this report due to limited market demand, fuel storage requirements will need to be reassessed when demand does exist.

Long-Term Development

Required Projects

- Install MALSR** - According to FAA AC 150/5300-13, in order to obtain a ½-statute mile visibility associated with a Category I precision approach, a Medium-Intensity



Approach Lighting System with Runway Alignment Indicator is required. For instrument runways yellow lights replace white on the last 2,000 feet of either runway end to designate a caution zone for landing. The MALSR will extend approximately 2,440 feet and starts at the runway threshold. However, penetrations to the 50:1 approach slope must be removed, lowered or relocated (i.e. FPL Power Transmission Lines).

- **Upgraded Runway 10R-28L Edge Lighting** – To support lowering the visibility minima to the precision approach to Runway 10R, the current runway edge lighting will need to be upgraded from medium intensity to high intensity runway lights. Runway edge lighting is primarily white with the exception of the last 2,000 feet of each end which designates a caution zone for landings.
- **Install Instrumented Runway Visibility Range Sensor (Transmissometers)** – One transmissometer should be installed on one side of the runway (typically near the glide slope antenna) relatively close to the pavement edge. The RVR defines the distance over which a pilot of an aircraft on the centerline of the runway can see the runway surface markings. The maximum RVR reading is currently 6,500 feet.

Recommended Projects

- **Expand West GA Apron** – Previous recommendations include construction of a 2,500 square yard apron adjacent to Runway 10L-28R and Taxiway F to accommodate general aviation training operations. With the expansion of commercial demand, expansion of the West GA apron is recommended to accommodate either relocated or additional general aviation demand.
- **Install North-South Connecting Taxiway** – Since Alternative 2B anticipates the use of FPR by commuter/regional affiliate air carriers, development of a north-south connecting taxiway to Runway 10L-28R would not only provide access to facilities adjacent to the new runway but also lay the groundwork for the potential of some sort of commercial or air carrier support development adjacent to the West GA apron. Although it is initially anticipated that Commercial Terminal facility requirements can be supported by retrofitting the existing Airport Administration Building, in the long-term, commercial support facilities including the terminal and US Customs and Border Protection may need to be relocated to a larger centralized location in order to support demand.

It is, therefore, recommended that the north-south taxiway connect to the threshold of Runway 10R, and run along the east side of the proposed West GA apron. This taxiway should be approximately 50 feet in width, with pavement strength of approximately 100,000 pounds and equipped with MITLs and required markings. Although this taxiway may provide connectivity between the training runway and



main airfield, it also allows Airport Management flexibility for future commercial development.

- **Environmental, Drainage and Project Permitting** – As noted earlier, because of existing tree, gopher tortoise, scrub jay, and wetland mitigation areas and potential change in aircraft fleet mix, a variety of environmental studies related to noise, air quality, potential species and wetland impacts will need to be conducted prior to construction. This combined with drainage requirements associated with expanded facilities will require the airport to work with a number of local and federal agencies to obtain permitting prior to construction. These projects should be implemented at least one (1) year prior to intended design in order to address potential issues and requirements.

Airport Alternative 3 – Air Carrier Commercial Development

Alternative 3, *Air Carrier Commercial Development*, is based upon the long-term assumption that ultimately FPR could support legacy carrier and point to point large commercial passenger operations as illustrated in **Figure 5-29**. Again, this development is for discussion only since at this time no demand exists for any type of commercial passenger service at FPR. However, in the interest of identifying long-term requirements for the purpose of reserving property for future aviation development, the Boeing 737-800, the most widely used domestic aircraft, was used as the critical aircraft for future commercial development at FPR.

Alternative 3 also assumes that based aircraft, businesses, and operational activity demand will exceed the growth scenarios identified in the forecast chapter. Various airside and landside improvements including those associated with commercial passenger services are shown to account for increased activity. Although projects are designated as either required or recommended, projects listed in **Table 5-22** are typical for commercial passenger service airports in the South Florida Market (i.e. Ft. Lauderdale International, West Palm Beach, Miami-Dade, etc.). Because of limited market data, however, a number of commercial requirements were relegated to beyond the twenty-year planning period. Market demand will need to be determined before an accurate forecast of facility requirements of this magnitude can be determined.



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**TABLE 5-22
AIRPORT ALTERNATIVE 3 PROJECTS**

Project Phase	Required	Recommended
Short-Term		
Mid-Term	Install MALSAR - Runway 10R	Displace Threshold Markings Runway 32
	Upgrade MIRLs to HIRLs on Runway 10R-28L	Airport Drainage Improvements
	Install RVR Sensor/Transmissometer	Extend Taxiway A-3 North to Connect with Runway 14 Threshold
	Environmental & Permitting	Construct Holding Pad (Taxiway A-3 and Runway 14)
	Airport Drainage Improvements	Expand Fuel Facilities (60,000 gallons)
	Additional ARFF Vehicle and Extinguishing Agent	
	Install North South Connecting Taxiway	
Long-Term	Environmental Impact Statement - Runway 10R Extension	Tree Survey
	ATCT Rehabilitation and Tower Study	Relocate Tree Mitigation Area (110 Acres)
	SIDA Security Facilities	Construct Partial North Parallel Taxiway - Runway 10R-28L
	Additional Security Fencing, surveillance and emergency control room	Relocate Gopher Tortoise Mitigation Area
	Upgrade parts of Perimeter Fence	Preserve Property East of Runway 28L and 28R for aviation related development
	FAR Part 150 Study	Preserve property west of Runways 10R and 10L for aviation related development
	Expand Electrical Vault	
	Drainage Improvements	
	Expand North West Apron	
Beyond 20-Year Planning Period	ARFF Satellite Facility (3 trucks and AFFF)	
	Utilities, Infrastructure and Traffic Concurrency	
	New Terminal Facilities - 20,000 SF Building	
	Construct New US Customs Facilities	
	Rental Car Facilities	
	Extend Runway 10R-28L to 8,000 feet	
	Relocate MALSAR	
	Relocate RVR Transmitter (Transmissometer Antenna)	
	Install Two Additional Transmissometer Antennae	
	Strengthen Runway 10R-28L to 200,000 lbs Dual Wheel	



**TABLE 5-22
AIRPORT ALTERNATIVE 3 PROJECTS**

Project Phase	Required	Recommended
	Install Runway Centerline Lighting System	
	Install Runway Entrance Lights (RELs)	
	Extend Taxiway A	
	Install Hold Pad - Extended Taxiway A	
	Extend North Parallel Taxiway - Runway 10R-28L	
	Strengthen Taxiway A and Connectors to 200,000 lbs DTW	
	Strengthen North Parallel Taxiway (Runway 10R-28L) to 200,000 lbs DTW	
	Strengthen North - South Connector Taxiway to 200,000 lbs DTW	
	Construct New North South Taxiway to Commercial Facilities at threshold of New Runway 10R	
	Install Local Area Augmentation System	
	Install approach lighting - Runway 28L	
	Install Taxiway Centerline Lights	
	Install Taxiway Centerline Lead in and Lead Off Lights	
	Extend Runway 10L-28R to 6000 feet	
	Widen and Strengthen (100,000 lbs DW) Runway 10L-28R	
	Upgrade Runway 10L-28R to non-precision approach	
	Widen, extend and strengthen (100,000 lbs DW) South Taxiway - Runway 10L-28R	
	Construct North Parallel Taxiway - Runway 10L-28R	
	Construct GA Apron (20,000 SY) North of Runway 10L-28R	
	Construct Satellite ARFF Station	
	Purchase additional ARFF Equipment	
	Expand Internal Perimeter Road	
	Fuel Storage Expansion	
	Roadway, Access and Signage Improvements	

Source: The LPA Group Incorporated, 2009-10

Since Alternative 3, like Alternative 2B, is the next phase of commercial development, short-term required and recommended projects were addressed in previous sections. Projects associated with Alternative 3 are described below.



Mid-Term Development

Required Projects

- **Relocate FPL Power Lines, install MALSR and Upgrade Runway Edge Lighting** – As stated in Alternative 2B, to accommodate ½ statute mile approach visibility and increase operations on Runway 10L-28R, the FPL Power Lines would need to be relocated. Further, approach lighting would need to be installed and the current runway edge lights on Runway 10R-28L would need to be upgraded from medium to high intensity.
- **Install RVR Sensor** – Any runway with an ILS approach and visibility minimum of ½ statute mile requires the installation of an runway visual range sensor (i.e. transmissometer) which is used to define the distance over which a pilot can see the runway surface markings.
- **Environmental, Drainage and Permitting** – As noted in Alternatives 2A and 2B, because of existing mitigation and conservation areas within the existing property boundary in addition to a variety of storm water retention facilities, any proposed development must evaluate the potential impacts to these facilities.
- **Additional ARFF Vehicle and Extinguishing Agent** - ARFF facilities, equipment and extinguishing agents are based upon the air carrier aircraft length and average number of daily departures. Again, since a commercial forecast was not developed for this master plan, it is anticipated that under the unconstrained air carrier scenario that FPR will operate under ARFF Index B.
- **Install North South Connecting Taxiway** – To provide access to the new training runway, a north-south connecting taxiway is recommended to be constructed from the current threshold of Runway 10R and to run northward to provide access to Taxiway F (parallel taxiway south of Runway 10L-28R).

Recommended Projects

- **Extend Taxiway A** – To provide access to the West Airport Commerce Park as well as provide access for proposed aviation development to the south, as described in Alternatives 2A and 2B, an extension of Taxiway A would be required.
- **Displace Runway 32 Landing Threshold** – Like in Alternative 1, declared distances would be instituted with the relocation of the landing threshold on Runway 32. As noted earlier, portions of the existing runway protection zone for Runway 32 is located outside the airport property line. Since FAA recommends that airport control this property to avoid incompatible land use, options include relocating the threshold so



the RPZ remains on airport property, acquiring the property through fee simple purchase, or acquiring the property through an aviation easement.

- **Airport Drainage Improvements** – Two storm water drainage ponds are located southwest and northeast of the current Runway 32 RPZ. If relocation of the landing threshold and RPZ were determined the best course of action, then these ponds would need to be relocated.
- **Extend Taxiway A-3 and Construct Holding Pad** – To provide access to facilities on the west side of the airfield, an extension of Taxiway A-3 to the north providing access to the new threshold of Runway 14 is recommended. A holding pad would also be constructed in conjunction with this extension to provide a run-up area for aircraft waiting to use Runway 14-32.
- **Expand Fuel Facilities** – Although no commercial forecast was developed, it is anticipated that an increase in Jet A demand would occur to accommodate commercial passenger operations. Further, additional general aviation facilities related to planned Key Air and APP Jet Center expansion plans would likely increase demand by corporate and charter operators as well. Thus, to accommodate the anticipated increase in fuel demand, an expansion of fuel facilities to provide 60,000 gallons of Jet A fuel is recommended. Again, market demand related to passenger traffic was unavailable; thus, an evaluation of fuel demand will need to be revisited in future studies.

Long-Term Development

Required Projects

- **Environmental Assessment/Impact Statement** - The recommended development especially associated with runway extensions and apron construction will likely have some environmental impacts. Therefore, this alternative, like Alternative 2B, will require significant regulatory and federal/state permitting requirements to be obtained prior to design and construction.
- **Security Improvements** – As noted in **Section 5.5.6, Commercial Requirements**, the sterile area adjacent to the airport terminal and commercial apron requires special security requirements (i.e. fencing, CCTV cameras, employee background checks and badging, etc.) The purpose of these security measures is to limit unauthorized access to high level security areas. This also typically includes US Customs, the airfield in general as well as airport electrical vault, fuel facilities, etc. including any airport facility which could be vulnerable to criminal mischief.

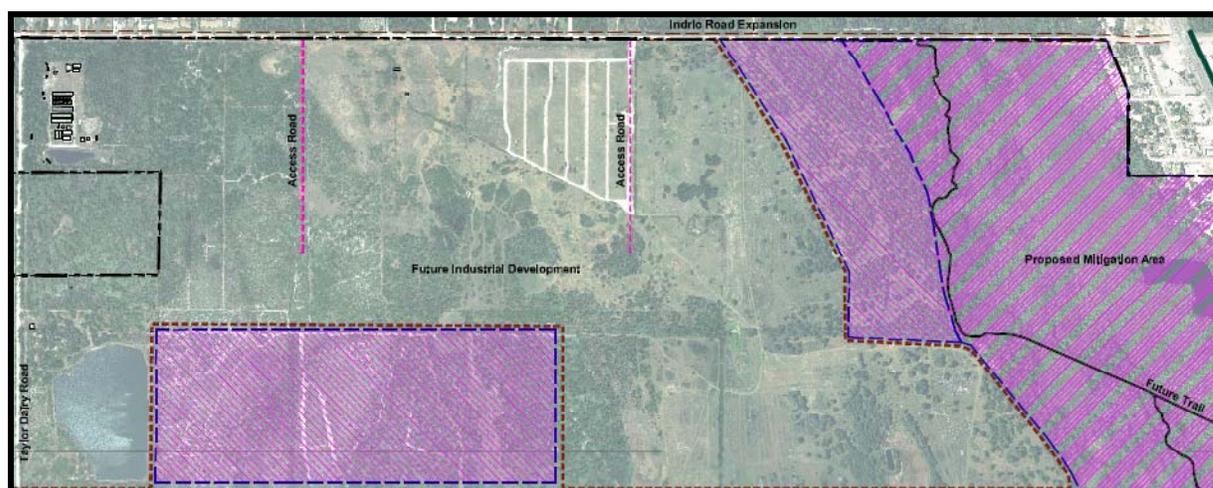


- **Perimeter Fence** – According to FAA Advisory Circular 107, Airport Security, and AC 150/5360-13 and discussions with Airport Certification Division, a minimum fence height of 8 feet fence material with 3 strands of barbed wire to provide a height of approximately 10 feet is recommended. If the airport has a specific wildlife issue (i.e. Deer), than the fence should be approximately 12 feet high as recommended in the 2004 Airport Safety Alert.
- **Electrical Vault Improvements** – Expansion or construction of an additional electrical vault is recommended to accommodate planned long-term airfield lighting and security improvements.
- **Rehabilitation/Improvements to Airport Drainage** – Drainage requirements will expand in conjunction with the amount of impervious service added to the airfield. Improvements to existing drainage and additional facilities will likely be required to accommodate proposed development.
- **Conduct FAR Part 150 Study** –It is anticipated that proposed development will significantly change the fleet mix of the airport especially related to commercial passenger and corporate aviation demand. An initial Part 150 Study should be performed in the short to mid-term to accommodate demand for stronger airfield pavement strength as well as the proposed extension of Runway 14-32. The Part 150 study recommended for Alternative 3 should focus on forecast commercial passenger operations related to regional and legacy carrier operations using regional jets and narrow body aircraft such as CRJ 900 and Boeing 737.
- **ATC Tower Siting Study** – In support of legacy carrier commercial passenger operations, airfield improvements including extensions of Runways 14, 10R and 28R as well as taxiway and apron improvements may impact ATC line of sight requirements. Therefore, it is recommended that a Tower siting study be completed to determine if improvements to the existing tower (i.e. increased height) would be needed or if relocation of the tower would provide the optimal operating and cost effective solution.
- **ATCT Rehabilitation or Relocation**– Rehabilitation of the existing ATC tower in the short-term is recommended for all alternatives specifically due to the age of the tower. Still in conjunction with the Tower Siting Study, it may be determined that the existing Tower may either need to be retrofitted or relocated to accommodate recommended airfield improvements.

Recommended Projects

- **Tree Survey** – In order to accommodate development adjacent to Runway 10L-28R, the current tree mitigation zone (approximately 100 acres) north of Training Runway 10L-28R would need to be relocated. Based upon planned development and existing species, several tree mitigation sites are recommended within the north side of the airport property as shown in **Figure 5-30**.

Figure 5-30
Tree Mitigation Options



Based upon these recommendations, a tree survey would be required to determine if these areas meet the mitigation requirements as stated in Chapter 6 of the Land Development Code, Section 6.00.00, *Vegetation Protection and Preservation*.

- **Relocate Tree Mitigation Zone** – Thus, in order to accommodate planned aviation development north of Runway 10L-28R, relocation of the existing 110 acre tree mitigation site is required. As illustrated in **Figure 5-30**, two sites are recommended. Each site would provide a buffer between proposed aviation and non-aviation development as well as a noise buffer to contiguous residential neighborhoods north and northeast of the airfield.
- **Construct Partial North Parallel Taxiway Runway 10R-28L** – To provide additional access to the North-South Taxiway and recommended aviation development north and south of Runway 10L-28R, a partial parallel taxiway which connects extended Taxiway A-3 and the North-South Taxiway is recommended. This allows aircraft from the north to access the threshold of Runway 14 without having to back taxi or cross Runway 10R-28L.



- **Relocate Gopher Tortoise Mitigation Area** – The current Gopher Tortoise mitigation site is located within the approach surface of Runway 28L. To accommodate preserving the area (approximately 39 acres) for future aviation related improvements (i.e. lighting, navigational aids, safety zones, etc.). As part of the EA process, an alternate location will be found.
- **Preserve property east of Runway 28L for future aviation development** – Although not required for a runway extension based upon the current commercial aircraft fleet, the property east of Runway 28L threshold should be reserved for safety area and potential installation of additional navigational and visual aids.
- **Preserve Property East of Runway 28R** – Again, an extension of Runway 28R is recommended to accommodate the anticipated commercial role of FPR beyond the twenty-year planning period. Therefore, it is recommended that property east of the current Runway 28R remain clear of development.
- **Preserve Property West of Runway 10R** – As noted in **Section 5.8.2, *Runway Alternatives, Runway 10R-28L***, to accommodate the potential for commercial passenger service by a legacy type carrier (i.e. American Airlines) using a Boeing 737-800, a runway length of 8,000 feet would be required. Thus, in order to accommodate the potential for such development, preservation of existing airport property to the west is recommended. Further, coordination with St. Lucie County Planning and Development Services and Transportation Planning is required to maintain compatible land use and limit obstructions to air navigation.
- **Preserve Property West of Runway 10L** – While an extension of Runway 10L was not considered a viable option, to maintain clearance for approach and departure surfaces especially related to aviation training, existing airport property and contiguous property to the west should be preserved to maintain compatible land use.

Beyond Twenty-Year Planning Period

As stated in previous sections, commercial passenger demand forecasts were not developed as part of this master plan update. Since the airport is currently designated as “general aviation”, it was anticipated that commercial development of the magnitude outlined in Alternative 3 would not occur until beyond the twenty-year planning period. Still to provide the County with options for future potential development, projects were identified beyond the typical planning period.

- **Runway 10R-28L Improvements** – If demand exists, an extension of Runway 10R-28L to provide a total length of 8,000 feet is recommended. Further, the pavement would need to be strengthened to provide dual wheel strength of 200,000 pounds. Strengthening Runway 10R-28L to 200,000 pound dual tandem wheel allows its use by



all narrow-body commercial aircraft and 50 percent of wide-body commercial aircraft currently within the fleet. This pavement strength is similar to other commercial airports within the South Florida Market Area. In conjunction with the proposed extension to the west and pavement strengthening, the approach lighting (MALSR), glide slope antenna and RVR Antenna would need to be relocated.

- **Upgrade Runway Edge Lighting** – In conjunction with the lower visibility minimums on Runway 10R-28L, existing runway edge lighting would be upgraded from medium to high intensity lights.
- **Install Local Area Augmentation System (LAAS)** – A LAAS is defined as an all-weather aircraft landing system located on airport property which provides a real-time differential correction of the GPS signal. It has recently been approved for use at Memphis International Airport and is expected to replace the standard instrument landing system equipment (i.e. localizer and glide slope antennae). However, lighting systems (i.e. MALSR) and visibility/weather antenna (i.e. transmissometers) will still be required. Installation of a LAAS at FPR will allow for increased air traffic flexibility and overall airport capacity, and the installation of a GPS approach on Runway 10L-28R. Although currently being implemented, based upon discussions with FAA Headquarters, ILS systems will remain in place for the near future to provide a back-up system in case the LAAS becomes inoperative.
- **Install and Relocate Instrumented Runway Visibility Range Sensors (Transmissometers)** – Three transmissometers should be installed adjacent to the Runway 10R-28L pavement edge. One transmissometer should be located by each runway threshold and one at midpoint. This will allow an accurate measurement of aircraft visibility associated with the instrument approach. The maximum RVR reading is currently 6,500 feet.
- **Install Runway Centerline Lighting System** – Since Runway 10R-28L is designed to accommodate commercial operations associated with air carrier aircraft with greater than 30 seats, in-pavement runway centerline lights should be installed at 50 foot intervals. When viewed from the landing threshold, the runway centerline lights are white until the last 3,000 feet of the runway. From there, the white lights alternate with red for the next 2,000 feet, and for the last 1,000 feet of pavement the centerline lights are all red.
- **Install Runway Entrance Lights (RELs)** - The REL system is composed of flush mounted, in-pavement unidirectional figures that run parallel to and along the taxiway centerline. These lights direct the pilot at the hold line. The REL starts at the hold line and consists of a series of evenly spaced lights to the runway edge. When



activated, these red lights indicate that there is high speed traffic on the runway or there is an aircraft on final approach within the activation area.⁴⁸

- **Extend and Strengthen Supporting Taxiways** – In conjunction with an extension of Runway 10R, Taxiways A and the partial parallel north taxiway would also need to be extended to the west to provide access to the relocated threshold. Further, based upon aircraft demand, the pavement strength of both would be upgraded from 90,000 dual wheel to 200,000 dual tandem wheel. The current and proposed taxiway widths of 50 feet would be adequate to accommodate anticipated critical aircraft requirements.
- **Runway 10L-28R Improvements** -With the addition of commercial service, extending Runway 10L-28R to provide a total takeoff and landing length of 6,000 feet and while widening and strengthening the pavement to 100 feet and 100,000 pound dual wheel strength, respectively, will allow Runway 10L-28R to be used as a secondary primary or alternate runway during peak operating periods by providing additional separation of operations (i.e. corporate/commuter on Runway 10L-28R and commercial on Runway 10R-28L)
- **Construct North-Parallel Taxiway – Runway 10L-28R** - To provide access to proposed General Aviation development north of Runway 10L-28R, a full-length parallel taxiway constructed at a centerline width of 400 feet would be constructed.
- **Upgrade Runway and Taxiway Markings on Runway 10L-28R** – Currently, Runway 10L-28R is equipped with basic markings since it is designed to accommodate training aircraft using a visual approach only. However, it is recommended as part of the proposed extension that the runway be upgraded to a non-precision runway via the addition of a GPS approach, therefore requiring additional markings and signage.
- **Install Taxiway and Runway Distance to Go Signage** – In addition to signage improvements recommended for Runways 10R-28L and 14-32, distance to go, identification and guidance signage is also recommended on Runway 10L-28R and associated taxiways in conjunction with the proposed extension.
- **Install Taxiway Centerline Lights** – As required under FAR Part 139, medium intensity taxiway centerline lights should be installed on Taxiways A, the proposed connector taxiway, parallel taxiway north of Runway 10R-28L as well as the North-South Connector Taxiway.
- **Install Taxiway Centerline Lead on and Lean Off Lights** – Taxiway Centerline Lead On and Off lights are used to provide visual guidance to persons entering or exiting an instrument runway. These runways are color-coded to warn pilots and vehicle drivers that they are within the runway environment or ILS critical area.

⁴⁸ FAA Airport Instruction Manual, Chapter 2, Aeronautical lighting and other airport visual aids.



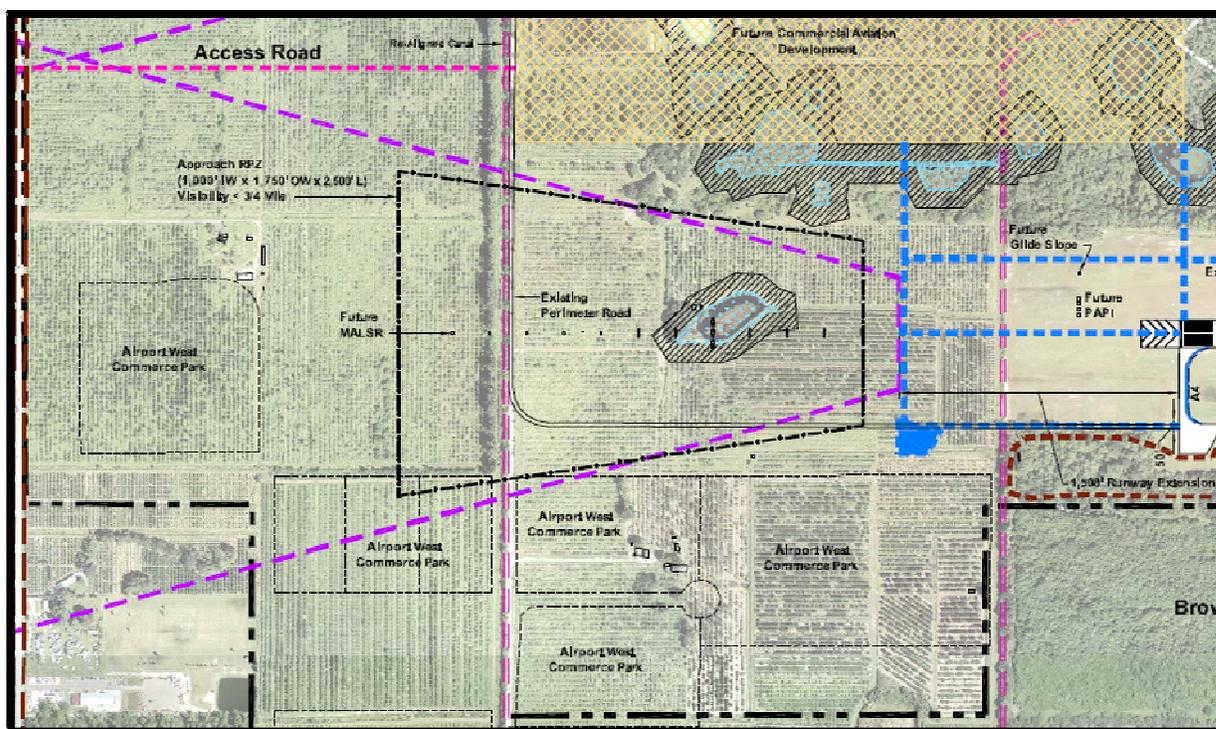
- **Construct Additional North-South Taxiway** – As shown in **Figure 5-29, Alternative 3**, along with the extension of Runway 10R and associated taxiways to the west, an additional north-south taxiway should be constructed to provide access from the existing airfield to proposed commercial development between Runway 10R and 10L. In conjunction with this development, a holding pad would be constructed south of the Taxiway A to allow aircraft to hold before either accessing Runway 10R or the proposed north-south taxiway.
- **Connecting North-South Taxiways (Extension of Taxiway B)** – With the extension of Runway 10L-28R, an extension of Taxiway B to the north (4000 x 50 ft) would support long-range development. This taxiway would also provide direct runway access to and from the north central aviation apron and associated facilities, including proposed satellite ARFF.
- **General Aviation Apron North of Runway 10L-28R** – A proposed 2,500 SY general aviation apron to accommodate corporate tenants and operations is recommended for the area currently designated for Tree Mitigation. This 110 acre parcel abuts planned industrial development on the northern portion of the airport property as well as provides access to the airfield. As a result, an alternate location for the Tree Mitigation area has been defined as part of this alternative.
- **Airport West Commerce Park** – With the extension of Runway 10R, some parcels within the Airport West Commerce Park may be impacted. A portion of the three south parcels would be located within the new runway protection zone of Runway 10R as well as within the 62.5:1 departure surface⁴⁹ as shown in **Figure 5-29**. Another larger parcel east of King’s Highway with the Commerce Park may also be impacted by the Runway 28L departure surface requirements. However, based upon continued discussions with FAA Flight Standards, this may only require that buildings within the departure surface remain below a pre-determined height. As noted in previous alternative discussions, all proposed development both on and adjacent to the airport should file a Notice of Proposed Construction with FAA to determine proposed impact (if any) and building elevation restrictions.

Further, since technological advances have and will continue to increase the accuracy of aircraft avionics, it is anticipated that the runway protection zone and departure zone criteria as shown in **Figure 5-31** could become smaller and narrower than currently required. Further, development of the Airport West Commerce Park provides revenue to support the local match on critical projects, such as the rehabilitation of Runway 10R-28L. Therefore, since demand for an extension is not

⁴⁹ FAA Advisory Circular 150/5300-13, Change 12, Appendix 2 and FAA Regional Office Flight Standards Division – 62.5:1 departure surface requirement is expected to go into effect in 2010.

warranted at this time and the purpose of this exercise is to merely determine the amount of area needed to preserve for future airfield development, continued development of the Airport West Commerce Park is recommended.

Figure 5-31
Airport West Commerce Park



Source: The LPA Group Incorporated, 2009

- **Passenger Terminal Apron** – As part of planned commercial development, aircraft parking apron should be constructed between Runways 10R and 10L to accommodate commercial parking requirements adjacent to the terminal and relocated US Customs and Border Protection Facilities. Access to this apron could be obtained via the proposed Runway 10R north taxiway and the north-south connector taxiways.
- **Construction of New Commercial Terminal Facilities** – A new passenger terminal complex, including parking, building and access is recommended for the recently acquired property north of Runway 10R and south of Runway 10L. Access to this facility could be provided via King's Highway to the west. Since a commercial forecast, however, was not developed as part of this master plan update, recommended sizing of approximately 20,000 SF including building maintenance, utility and

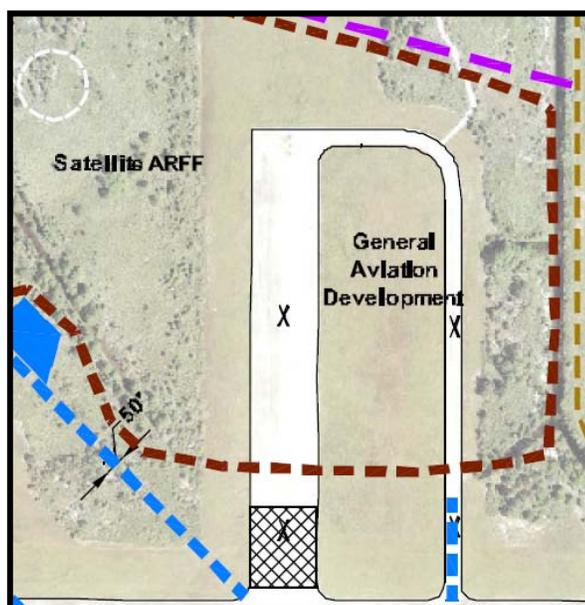


mechanical areas is initially recommended. It is also suggested that airport management offices and associated facilities be relocated to the passenger terminal as well.

- **Construct new US Customs and Border Patrol facilities** – As described in **Chapter 4, Facility Requirements**, and in Alternatives 2A and B, US Customs and Border Protection Requirements associated with a commercial service airport range from 15,500 SF to 125,000 SF. Since this alternative assumes regularly scheduled service and the fact that current US Customs and Border Protection personnel support the deep water port of Ft. Pierce, it is likely that a 20,000+ SF building may be required. Discussions are also being held with local TSA and US Customs Facilities Management to determine if non-sterile and administrative facilities for both agencies could be consolidated in one building. To date, however, discussions are still ongoing as to the viability of such a proposal. However, it is proposed that the new US Customs facilities be located west of the suggested new commercial terminal facilities, thereby providing ease of access to King’s Highway.
- **Construct Rental Car Facilities** – While not required by FAR Part 139, the demand for car rental facilities at a commercial service airport is recommended based upon historic demand at other airports. It is recommended that rental car facilities be located adjacent to the new airport entrance road and that car rental retail locations be located within the commercial terminal facilities.
- **Automobile Parking** - As with the construction of any new facilities, additional parking will be required for each type of development shown. Aircraft storage and commercial developments shown each have their own designated parking facilities which are included as part of the leasehold development.
- **ARFF Emergency Response Trucks and Materials** – FPR is already equipped with Index A firefighting equipment, materials and personnel. However, in order to accommodate larger commercial aircraft operations, similar to a Boeing 737-800, additional equipment, supplies and personnel will be required to meet Index C requirements. Index C requires:
 - Three Vehicles
 - One vehicle carrying:
 - 500 pounds of sodium based dry chemical or halon 1211; or
 - 450 pounds of potassium based dry chemical and water with a commensurate quantity of aqueous fire fighting foam (AFFF) to total 100 gallons, for simultaneous dry chemical and AFFF foam application

- Two vehicles carrying an amount of water and the commensurate quantity of AFFF so that the total quantity of water for foam production carried by all three vehicles is at least 3,000 gallons (FAR Part 139.317)
- **Construct ARFF Satellite Station** – The current ARFF is located on the east side of the airfield near the threshold of Runway 28L. With the expansion of commercial passenger service and ARFF response time requirements, it is recommended that a satellite ARFF station including trucks and extinguishing be constructed on the north central apron (as illustrated in **Figure 5-32**) adjacent to Taxiway B to allow ease of access to expanded commercial and general aviation facilities. This along with expansion of the perimeter road and taxiways will allow ARFF to respond within the two - three minute requirement to all points within the airfield.

Figure 5-32
ARFF Satellite Station



- **Perimeter Road** – As noted within FAR Part 139 Commercial Service requirements, a perimeter service road should be constructed to run along the interior perimeter of the airport fenceline to allow for daily inspections of airport property and facilities. Use of the perimeter road is restricted to airport service vehicles. Operators would be required to undergo specific training and vehicles would be equipped with radios to maintain contact with the Air Traffic Control Tower.



- **Fuel Storage Expansion** – With the anticipated addition of large air carrier commercial service at FPR, fuel demand, specifically, Jet A will also increase. General aviation operations, including corporate jet aircraft, are also expected to increase due to available facilities and expected business growth in the County, thereby increasing fuel demand. To accommodate both general aviation and commercial demand, additional fuel facilities, including tanks and trucks, would be required. The local FBOs may provide fueling services to the commercial operators, similar to Signature Aviation’s operations at St. Petersburg Clearwater International Airport or Executive Air’s operations at Syracuse International Airport. However, if demand warrants, the airline itself may provide a station at FPR in support of their operations and a distribution system could be constructed adjacent to the commercial apron. In either case, additional fuel facilities including tanks, fire suppression, fuel distribution and security will be required to support proposed development. Since a forecast of commercial demand was never developed, based upon airport’s supporting similar traffic, at least 80,000 gallons of Jet A fuel Storage and 10,000 gallons of 100LL (Avgas) would likely be required in support a three (3) day peak period for commercial and general aviation operations.
- **Access and Signage Improvements Roadway, Access and Signage** – Access to commercial development and north GA area can be provided via King’s Highway. Access to the North Airport Industrial Park can be obtained via an entrance road off of both King’s Highway to the west and Indrio Road to the north. Access to the existing FBO and other tenant facilities to the south should be expanded to assist with additional traffic demand. Property should be reserved to provide roadway expansion, including turning lanes, beyond the twenty-year planning span of this document. Roadway development needs to be coordinated with the St. Lucie Transportation Planning Organization and FDOT to accommodate future demand and potential concurrency requirements for non-aviation related facilities. The Airport must coordinate with TPO and Planning and Development Services departments to determine if proposed development can be supported by the existing road network, water, sewage and related infrastructure.
- **Utilities, Infrastructure and Traffic Concurrency** – This alternative recommends significant long-term development of property which currently is not equipped with utilities or access. In addition, proposed access roads associated with non-aviation development must be coordinated with St. Lucie TPO and Planning and Development Services departments to accommodate concurrency requirements on both King’s Highway and Indrio Road. A traffic management study may be required in conjunction with the proposed North Airport Industrial/Commercial Development.



5.8 Alternative Evaluation Matrix

In order to determine the preferred development option, each concept was evaluated based upon inherent strengths and weaknesses as well as the long-term role of the airport. To determine the preferred development, each concept was evaluated based upon the following criteria:

- Flexibility
- Phasing/construction
- Environmental effects
- Operational effectiveness
- Safety considerations, and
- Community acceptance.

5.8.1 Flexibility

Ability to Respond to Uncertain Growth

The ability to respond to uncertain demand levels determines each alternative's ability to accommodate demand in excess or lower than anticipated. Differences in the alternative layouts determine their ability to accommodate future demand.

Balance of Support Functions

This factor evaluates the siting of support functions such as fueling, airport maintenance, and other similar facilities. The idea is to locate this land use with access and centrally orient it to serve proposed aviation related development.

Ability to Satisfy Changing Tenant Demands

This factor evaluates the ability to accommodate changing needs of FBO operations and other private and corporate tenants.

Ability to Support Long-Term Vision

This factor considers the viability of the proposed development to accommodate the long-term role of FPR based upon input from the Technical Advisory Committee, BOCC and Community as a whole.

5.8.2 Phasing/Construction

Ability to Phase Construction

This factor examines the impact of construction on airport operations, potential relocations, and other airport related activity. Phasing of any development must be considered in light of operations taking place at the time of construction. Phasing may be impacted by shifts in airport activity or by impacts to ground movements by vehicles and aircraft. Phasing impacts must be noted as their impacts may require alternative planning or temporary facilities to



provide relief.

Impact to Existing Facilities

This factor evaluates the impact that new development will have on existing airport facilities, including effects on its operation, function, or potential relocation.

Ability to Incrementally Expand

This factor evaluates the ability for the site build-out to be conducted in phases and its impact on operations. Considering each layout, it is deduced that each concept is adequately capable of being developed incrementally.

In all four alternative scenarios, the airport would continue to support existing and forecast corporate, flight training, and recreational aviation activity. Therefore, some projects, both required and recommended based upon activity, are required in all four Alternative Scenarios. As a result, **Table 5-23, *Alternative Preliminary Development Costs***, identifies projects associated with all alternatives and those associated with a specific alternative.

As previously stated, projects were defined as either required or recommended in an effort to assist airport management in determining project priorities. Further, preliminary phasing was based upon planning, engineering and environmental requirements rather than financial feasibility. It is important to note that a requirement for one project (e.g. a runway extension) may trigger other projects (e.g. taxiway extension). Preliminary order of magnitude cost estimates, as illustrated in **Table 5-23** are provided in 2010 dollars based upon general engineering estimates and were developed merely to provide a comparison between proposed development options. More specific phasing and cost estimates associated with long-term development is provided in **Chapter 7, *Airport Implementation Plan***.



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
Short-Term Required Development:					
Security Fencing Improvements	\$165,000	\$165,000	\$165,000	\$165,000	\$165,000
Runway 14-32 Pavement Evaluation	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000
Install FAA Maintained Approach Lighting (i.e. ODALS or MALS)	\$621,000	\$621,000	\$621,000	\$621,000	\$621,000
Install (12 x 14')Electrical Vault to accommodate Approach Lighting	\$81,000	\$81,000	\$81,000	\$81,000	\$81,000
Replace VASIs with PAPIs - Runway 10R-28L	\$138,000	\$138,000	\$138,000	\$138,000	\$138,000
Rehabilitate Taxiway B	\$636,000	\$636,000	\$636,000	\$636,000	\$636,000
Rehabilitate and Widen Taxiway C	\$3,412,000	\$3,412,000	\$3,412,000	\$3,412,000	\$3,412,000
Rehabilitate and Widen Taxiway A	\$1,683,300	\$1,683,300	\$1,683,300	\$1,683,300	\$1,683,300
Relocate Lighted Segmented Circle	\$86,000	\$86,000	\$86,000	\$86,000	\$86,000
FAR Part 150 Study	\$67,000	\$67,000	\$67,000	\$67,000	\$67,000
Runway 10R-28L Strengthening Cost Benefit Analysis	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000
Runway 10R-28L Strengthening Environmental Assessment/Environmental Impact Statement	\$41,000	\$41,000	\$41,000	\$41,000	\$41,000
Permitting and Drainage Improvements	\$2,484,000	\$2,484,000	\$2,484,000	\$2,484,000	\$2,484,000
Realign Taxiway D-1 and remove old pavement	\$483,000	\$483,000	\$483,000	\$483,000	\$483,000
Relocate Drainage Ditch and Perimeter Road North of Runway 14	\$131,000	\$131,000	\$131,000	\$131,000	\$131,000
Retrofit Airport Administration to Commercial Terminal			\$702,000	\$702,000	\$702,000
Commercial Terminal Drainage			\$115,000	\$115,000	\$115,000
Expand US Customs and Border Protection's Facilities			\$1,094,000	\$1,094,000	\$1,094,000



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
US Customs' Drainage Improvements			\$62,000	\$62,000	\$62,000
Reconfigure Terminal Automobile Parking, including drainage			\$794,000	\$794,000	\$794,000
High Intensity Rotating Beacon			\$21,000	\$21,000	\$21,000
Expand Electrical Vault			\$153,000	\$153,000	\$153,000
Implement 62.5:1 departure surface criteria – Runway 28L			\$5,000	\$5,000	\$5,000
Install Distance to Go, Runway, Taxiway and Apron Identification and runway hold signs					\$116,000
Lighting improvements - Taxiways A, B, C & E - Part 139:					
Taxiway Centerline Reflectors					\$5,000
Clearance Bar Lights					\$104,000
Stop Bar Lights					\$223,000
Runway Guard Lights at each intersection with Runway 10R-28L					\$162,000
Install additional lighted wind cone and segmented circle – Training Runway 10L-28R					\$41,000
Total Short-Term Required	\$10,338,300	\$10,338,300	\$13,284,300	\$13,284,300	\$13,935,300
Short-Term Recommended Development:					
Install REILs – Runways 28L & 10L-28R	\$166,000	\$166,000	\$166,000	\$166,000	\$166,000
Install PAPIs - Runway 10L-28R	\$138,000	\$138,000	\$138,000	\$138,000	\$138,000
Rehabilitate ATCT Facilities	\$1,242,000	\$1,242,000	\$1,242,000	\$1,242,000	\$1,242,000
Airport Strategic Business and Marketing Plan, including GIS property survey	\$400,000	\$400,000	\$400,000	\$400,000	\$400,000
Install Bird Tracking Radar	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000
Extend Perimeter North (Hammond Road) - 500 LF	\$93,000	\$93,000	\$93,000	\$93,000	\$93,000
Airport West Commerce Park Development, permitting, drainage and additional infrastructure	\$800,000	\$800,000	\$800,000	\$800,000	\$800,000



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
Develop Property between St. Lucie Blvd and Curtis King Blvd (Formerly St. Lucie Fairgrounds Site), includes utilities, permitting and drainage	\$1,990,000	\$1,990,000	\$1,990,000	\$1,990,000	\$1,990,000
Tenant Development: APP Jet Center of Ft. Pierce Development (Est.):					
2 - 80 x 80 SF Corporate Hangars with Apron and Taxilanes	\$3,887,000	\$3,887,000	\$3,887,000	\$3,887,000	\$3,887,000
1 - 100 x 100 SF Corporate Hangar with Apron and Parking	\$2,535,000	\$2,535,000	\$2,535,000	\$2,535,000	\$2,535,000
1 - 15 Unit T- Hangar	\$1,041,000	\$1,041,000	\$1,041,000	\$1,041,000	\$1,041,000
1- 6 Unit T- Hangar	\$420,000	\$420,000	\$420,000	\$420,000	\$420,000
1-11 Unit T-Hangar	\$770,000	\$770,000	\$770,000	\$770,000	\$770,000
Drainage Improvements	\$275,000	\$275,000	\$275,000	\$275,000	\$275,000
Tenant Development: Key Air Development Plan (Est.):					
Apron Construction (2 ramps and connectors)	\$5,379,000	\$5,379,000	\$5,379,000	\$5,379,000	\$5,379,000
Roadway and Auto Parking	\$615,000	\$615,000	\$615,000	\$615,000	\$615,000
12,500 SF Terminal Facility	\$3,037,500	\$3,037,500	\$3,037,500	\$3,037,500	\$3,037,500
2 - Corporate Hangars (~163,000 SF total)	\$39,529,000	\$39,529,000	\$39,529,000	\$39,529,000	\$39,529,000
Drainage Improvements	\$450,000	\$450,000	\$450,000	\$450,000	\$450,000
Rehabilitate US Customs and Border Protection Facilities		\$900,000			
Expand Airport Administration Building		\$800,000			
Install Distance to Go, Runway, Taxiway and Apron Identification and runway hold signs			\$116,000	\$116,000	
Install Perimeter Service Road to connect inside fenceline			\$638,000	\$638,000	\$638,000
Lighting improvements – Taxiways A, B, C & E – Part 139:					
Taxiway Centerline Reflectors—			\$5,000	\$5,000	
Clearance Bar Lights			\$104,000	\$104,000	
Stop Bar Lights			\$223,000	\$223,000	



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
Runway Guard Lights at each intersection with Runway 10R-28L			\$162,000	\$162,000	
Additional Segmented Circle - Adjacent to Training Runway				\$41,000	
Total Short-Term Recommended	\$62,887,500	\$64,587,500	\$64,135,500	\$64,176,500	\$63,525,500
Total Estimated Short-Term Project Order of Magnitude Cost Estimates	\$73,225,800	\$74,925,800	\$77,419,800	\$77,460,800	\$77,460,800
Mid-Term Required Development:					
Strengthen (90,000 lbs DW) Runway 10R-28L	\$7,420,000	\$7,420,000	\$7,420,000	\$7,420,000	\$7,420,000
Strengthen (90,000 lbs DW) Taxiway A	\$1,812,000	\$1,812,000	\$1,812,000	\$1,812,000	\$1,812,000
Strengthen (90,000 DW) Taxiway C	\$1,032,000	\$1,032,000	\$1,032,000	\$1,032,000	\$1,032,000
Strengthen (90,000 DW) Taxiway D	\$484,000	\$484,000	\$484,000	\$484,000	\$484,000
Extend Runway 14-32, includes lights and markings	\$1,253,000	\$1,253,000	\$1,253,000	\$1,253,000	\$1,253,000
Strengthen (60,000 DW) Runway 14-32	\$4,474,000	\$4,474,000	\$4,474,000	\$4,474,000	\$4,474,000
Extend Taxiway B, includes lights, markings and holding pad	\$1,683,000	\$1,683,000	\$1,683,000	\$1,683,000	\$1,683,000
Strengthen Taxiway B (90,000 DW),	\$1,205,000	\$1,205,000	\$1,205,000	\$1,205,000	\$1,205,000
Strengthen (90,000 lbs DW) Aprons South, East, Center & Run-up	\$2,713,000	\$2,713,000	\$2,713,000	\$2,713,000	\$2,713,000
Strengthen Taxiways C-7 and C-8 between Runway 14-32 and Taxiway C to 60,000 lbs dual wheel	\$122,000	\$122,000	\$122,000	\$122,000	\$122,000
Widen Taxiway E from Taxiway C to Runway 14-32 to 50 feet	\$68,000	\$68,000	\$68,000	\$68,000	\$68,000
ALP or Master Plan Update	\$400,000	\$400,000	\$400,000	\$400,000	\$400,000



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
Strengthen (90,000 lbs) Taxiway E between Taxiway C and Taxiway A		\$400,000	\$400,000	\$400,000	\$400,000
Strengthen (90,000 lbs) Taxiway E from Taxiway A to Runway 28L		\$187,000			
Environmental & Permitting		\$400,000	\$400,000	\$600,000	\$800,000
Extend Taxiway D to Runway 28L Threshold			\$351,000	\$351,000	\$351,000
SIDA Security Improvements, including security response facilities, pavement marking, background checks, cameras, training, etc.			\$2,000,000	\$2,000,000	\$2,000,000
Acquire Easement/Property - Runway 32 RPZ			\$58,000	\$58,000	
Additional Security Fencing, Markings and Surveillance			\$500,000	\$500,000	\$500,000
Additional ARFF Vehicle and Extinguishing Agent				\$800,000	\$800,000
Relocate FPL Power Lines - Estimate				3,451,000.00	3,451,000.00
Install MALSR Runway 10R					\$500,000
Upgrade MIRLs to HIRLs on Runway 10R-28L					\$100,000
Install RVR Sensor/Transmissometer					\$117,000
Environmental & Permitting					\$549,000
Airport Drainage Improvements					\$718,400
FAR Part 150 Study					\$250,000
Install North South Connecting Taxiway					\$1,427,000
Total Mid-Term Required	\$22,666,000	\$23,653,000	\$26,375,000	\$30,826,000	\$33,829,400
Mid-Term Recommended Projects:					
ARFF Helipad and Associated Facilities	\$2,121,000	\$2,121,000	\$2,121,000	\$2,121,000	\$2,121,000
Install PAPIs - Runway 14-32	\$138,000	\$138,000	\$138,000	\$138,000	\$138,000
Install REILs – Runway 14-32	\$110,000	\$110,000	\$110,000	\$110,000	\$110,000



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
Tenant Development: APP Jet Center of Ft. Pierce Development (Est.):					
5 - 80 x 80 SF Corporate Hangars (South)	\$7,736,000	\$7,736,000	\$7,736,000	\$7,736,000	\$7,736,000
80 x 80 Corporate Hangars Apron and Taxilanes	\$1,372,000	\$1,372,000	\$1,372,000	\$1,372,000	\$1,372,000
4 - 10,000 SF Hangars	\$6,908,000	\$6,908,000	\$6,908,000	\$6,908,000	\$6,908,000
1 - 12,000 SF Hangar	\$2,076,000	\$2,076,000	\$2,076,000	\$2,076,000	\$2,076,000
1 – 3,600 SF Hangar	\$627,000	\$627,000	\$627,000	\$627,000	\$627,000
Southwest Apron Construction	\$1,641,000	\$1,641,000	\$1,641,000	\$1,641,000	\$1,641,000
Drainage Improvements	\$330,000	\$330,000	\$330,000	\$330,000	\$330,000
Tenant Development: Key Air Development Plan (Est.):					
2- Corporate Hangars with Offices	\$40,109,000	\$40,109,000	\$40,109,000	\$40,109,000	\$40,109,000
Apron Construction (2 ramps and connectors)	\$5,379,000	\$5,379,000	\$5,379,000	\$5,379,000	\$5,379,000
Auto Parking	\$765,000	\$765,000	\$765,000	\$765,000	\$765,000
Displace Threshold Markings Runway 32		\$12,000			\$12,000
Airport Drainage Improvements associated with displaced threshold		\$250,000			250000
Extend Taxiway A west, includes markings, lighting and drainage			\$729,000	\$729,000	\$729,000
Remove Taxiway E between Runway 28L and Taxiway A			\$60,000	\$60,000	\$60,000
Construct West GA Apron (~2500 SY)			\$285,000	\$285,000	\$285,000
Extend Taxiway C			\$1,500,000		
Construct Holding Pad - Taxiway C			\$100,000		
Environmental & Permitting			\$80,000		
Airport Drainage Improvements			\$100,000		
Expand Fuel Facilities (30,000 gallons)			\$1,242,000		
Extend Taxiway A-3 North to Connect with Runway 14 Threshold				\$1,438,000	\$1,438,000
Construct Holding Pad (Taxiway A-3 and Runway 14)				\$100,000	\$100,000



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
Environmental & Permitting				\$80,000	\$80,000
Airport Drainage Improvements				\$100,000	\$100,000
Expand Fuel Facilities (45,000 gallons)				\$1,561,000	
Expand Fuel Facilities (60,000 gallons)					\$2,082,000
Total Mid-Term Recommended	\$69,312,000	\$69,574,000	\$73,408,000	\$73,665,000	\$74,448,000
Total Estimated Mid-Term Project Order of Magnitude Cost Estimates	\$91,978,000	\$93,227,000	\$99,783,000	\$104,491,000	\$108,277,400
Long-Term Required Development:					
Airport Master Plan and ALP Update	\$400,000	\$400,000	\$400,000	\$400,000	\$400,000
Upgrade parts of Perimeter Fence adjacent to airside	\$77,000	\$77,000	\$77,000	\$77,000	\$77,000
Security Perimeter Fencing and Access Control	\$645,000	\$645,000	\$645,000	\$645,000	\$645,000
Install MALSRS - Runway 10R				\$500,000	
Upgrade MIRLS to HIRLS on Runway 10R-28L				\$100,000	
Install RVR Sensor/Transmissometer				\$117,000	
Environmental Impact Statement - Runway 10R Extension					\$750,000
ATCT Rehabilitation and Tower Study					\$1,100,000
SIDA Security Facilities					\$1,000,000
Additional Security Fencing, surveillance and emergency control room					\$1,500,000
Upgrade parts of Perimeter Fence					\$100,000
Expand Electrical Vault					\$1,126,000
Drainage Improvements					\$250,000
Expand Northwest Apron to accommodate commercial passenger facilities					\$10,000,000
Provide Access and Signage to					\$1,263,000



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
Northwest Apron					
Total Required Long-Term	\$1,122,000	\$1,122,000	\$1,122,000	\$1,839,000	\$18,211,000
Long-Term Recommended Development:					
North Industrial/Commercial Development:					
Environmental Assessment with tree and protected species survey and GPS wetlands delineation	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000
Utilities and Infrastructure	\$25,890,000	\$25,890,000	\$25,890,000	\$25,890,000	\$25,890,000
Access Roads	\$1,294,000	\$1,294,000	\$1,294,000	\$1,294,000	\$1,294,000
Drainage	\$600,000	\$600,000	\$600,000	\$600,000	\$600,000
Non-Aviation Development -Former Ridgehaven Subdivision:					
Utilities and Infrastructure	\$1,553,000	\$1,553,000	\$1,553,000	\$1,553,000	\$1,553,000
Environmental and Permitting	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
Access Roads and Signage	\$791,000	\$791,000	\$791,000	\$791,000	\$791,000
Drainage	\$114,000	\$114,000	\$114,000	\$114,000	\$114,000
Additional Perimeter Security Fencing	\$314,000	\$314,000	\$314,000	\$314,000	\$314,000
Acquire Parcels 40-42	\$264,000	\$264,000	\$264,000	\$264,000	\$264,000
Expand West GA Apron (5,000 SY)			\$314,000	\$314,000	
Construct North Taxiway on former North South Runway			\$396,000	\$396,000	\$396,000
Reconstruct North Taxiway on Former North South Taxiway			\$396,000	\$396,000	\$396,000
Construct North Central GA Apron (5,000 SY)			\$558,000	\$558,000	\$558,000
Construct Access Road and Signage to North Central GA Apron			\$225,000	\$225,000	\$225,000
Install North South Connecting Taxiway				\$730,000	
Relocate Tree Mitigation Area (110 Acres)					\$150,000
Construct Partial North Parallel Taxiway - Runway 10R-28L					\$1,100,000
Environmental Assessment with tree and protected					\$650,000



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
species survey and GPS wetland delineation - North GA Apron					
Relocate Portion of Gopher Tortoise Mitigation area east of Runway 28L					\$30,000
Preserve land east and west of Runways 10R-28L and 10L-28R for future aviation development				\$0.00	\$0.00
Total Recommended Long-Term	\$32,020,000	\$32,020,000	\$33,909,000	\$34,639,000	\$35,525,000
Total Long-Term Development Order of Magnitude Cost Estimates	\$33,142,000	\$33,142,000	\$35,031,000	\$36,478,000	\$53,736,000
Total Required Projects	\$34,126,300	\$35,113,300	\$40,781,300	\$45,949,300	\$65,975,700
Contingency (15%)	\$5,118,945	\$5,266,995	\$6,117,195	\$6,892,395	\$9,896,355
Total Required Projects Order of Magnitude Cost Estimates	\$39,245,245	\$40,380,295	\$46,898,495	\$52,841,695	\$75,872,055
Total Recommended Projects	\$164,219,500	\$166,181,500	\$171,452,500	\$172,480,500	\$173,498,500
Contingency (15%)	\$24,632,925	\$24,927,225	\$25,717,875	\$25,872,075	\$26,024,775
Total Recommended Projects only Order of Magnitude Cost Estimates	\$188,852,425	\$191,108,725	\$197,170,375	\$198,352,575	\$199,523,275
Total Project Order of Magnitude Costs	\$228,097,670	\$231,489,020	\$244,068,870	\$251,194,270	\$275,395,330
Beyond the 20-Year Planning Period (2028...)					
ARFF Satellite Facility (3 trucks and AFFF) – North Central Apron					X
Utilities, Infrastructure and Traffic Concurrency					X
New Terminal Facilities - 20,000 SF Building					X
Construct New US Customs Facilities					X
Rental Car Facilities					X
Extend Runway 10R-28L to					X



**TABLE 5-23
MASTER PLAN UPDATE
ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS
2010 DOLLARS**

Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
8,000 feet					
Relocate MALSR					X
Relocate RVR Transmitter (Transmissometer Antenna)					X
Install Two Additional Transmissometer Antennae					X
Strengthen Runway 10R-28L to 200,000 lbs Dual Wheel					X
Install Runway Centerline Lighting System					X
Install Runway Entrance Lights (RELs)					X
Extend Taxiway A					X
Install Hold Pad - Extended Taxiway A					X
Extend North Parallel Taxiway - Runway 10R-28L					X
Strengthen Taxiway A and Connectors to 200,000 lbs DTW					X
Strengthen North Parallel Taxiway (Runway 10R-28L) to 200,000 lbs DTW					X
Strengthen North - South Connector Taxiway to 200,000 lbs DTW					X
Construct New North South Taxiway to Commercial Facilities at threshold of New Runway 10R					X
Install Local Area Augmentation System					X
Install approach lighting - Runway 28L					X
Install Taxiway Centerline Lights					X
Install Taxiway Centerline Lead in and Lead Off Lights					X
Extend Runway 10L-28R to 6000 feet					X
Widen and Strengthen (100,000 lbs DW) Runway 10L-28R					X
Upgrade Runway 10L-28R to					X



TABLE 5-23 MASTER PLAN UPDATE ALTERNATIVE PRELIMINARY DEVELOPMENT COSTS 2010 DOLLARS					
Projects	All Alternatives	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3
non-precision approach					
Widen, extend and strengthen (100,000 lbs DW) South Taxiway - Runway 10L-28R					X
Construct North Parallel Taxiway - Runway 10L-28R					X
Construct GA Apron (20,000 SY) North of Runway 10L-28R					X
Construct Satellite ARFF Station					X
Purchase additional ARFF Equipment					X
Expand Internal Perimeter Road					X
Fuel Storage Expansion					X
Roadway, Access and Signage Improvements					X

Source: The LPA Group Incorporated, 2010

5.8.3 Preliminary Environmental Evaluation

In evaluating all four alternatives, the minimal amount of construction shown in Alternative 1 will create the least amount of environmental impacts. As Alternatives 2A, 2B and 3 become increasingly more aggressive, environmental impacts become more of a development and cost factor. Alternative 3, the most aggressive development alternative, proposes the construction of multiple aviation and non-aviation facilities throughout the airport's property and also recommends the transfer and/or acquisition of additional land for development. For this reason, substantial environmental impacts may be encountered during this option. In order to address these impacts environmental studies, relocation of protected species, and mitigation of wetland areas can all be expected during the pursuit of this alternative.

A general assessment of potential impacts was evaluated to determine the degree to which proposed development will impact the surrounding environs as outlined in **FAA Order 1050.1** and **FAA Order 5050.4**. Since all four Airfield Alternatives recommend an extension to Runway 14-32 and Alternative 3 suggests a long-term extension of both Runway 10R and 28R, environmental assessments will be required. An environmental assessment (EA) according to **FAA Order 5050.4B**, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, and **Order 1050.1E**, *Environmental Impacts*, is typically warranted when a major runway extension is recommended. "A runway extension, typically



identified as an action "normally" requiring an Environmental Assessment (EA), could be considered categorically excluded development, if it does not meet the definition of being a "major runway extension". All runway extensions are not defined as "major". A "major runway extension" is not runway length specific but is defined as an extension that increases noise by 1.5 DNL or greater over any noise sensitive areas located within the 65 DNL contour. It can also be defined as major if it: causes effects on the use of land protected by the Section 4(f) 1966 DOT Act, as amended; includes properties listed or eligible for listing on the National Register of Historic Places or properties of state or local historical/cultural significance; and/or affects land protected under the Farmland Protection Policy Act, wetlands, coastal zones, floodplains, and federally listed endangered or threatened species."⁵⁰

Further based upon discussions with the FAA Airports District Office, the proposed strengthening of Runways 14-32, 10R-28L and 10L-28R (Alternative 3) would also trigger an environmental analysis. The decision to apply a Categorical Exclusion, EA or Environmental Impact Statement (EIS) is at the discretion of the FAA Airports District Office. Proposed development would also require an Environmental Restoration Program (ERP) from South Florida Water Management District (SFWMD) in association with strengthening Runways 10R-28L or 14-32 as well as associated taxiway pavements. An ERP is required to meet storm water runoff treatment, water quality, and wetland protection regulations. Should the results of the EA or EIS determine the presence of gopher tortoise and their habitat or the presence of other protected species, species-specific surveys may be required to meet federal and state protected species regulatory standards. Mitigation and permits may also be required to compensate for any impact to protected species by the United States Fish and Wildlife Service (FWS) for federally protected species. Similarly, permits and mitigation maybe be required by FFWCC for state protected species. Further, any proposed development associated with potential wetland mitigation may require a dredge and fill permit from the COE.

Based upon **FAA Order 1050.1 and 5050.4**, all three alternatives will have construction impacts and disturb undeveloped property north of Runway 14. Airfield Alternatives 2B and 3 would also impact undeveloped property west of the Runway 10R threshold. Also long-term recommendations associated with Alternative 3 would further impact areas north of Runway 10L-28R as well as east of the existing Runway 28R threshold. All four airfield concepts will have construction and construction noise impacts, but these impacts will be limited primarily to the property north and west of Runway 14 and 10R, respectively. Since portions of the property prior to the Runway 10R threshold are wet, organic material removal and fill associated with lighting, navigational aids, and pavement improvements will be

⁵⁰ Environmental Policy, Federal Aviation Administration and Department of Transportation



required. The exact cut and fill required will be determined as part of the preliminary environmental, design and permitting process.

5.8.4 Preliminary Drainage Evaluation

As noted earlier, a Stormwater Master Plan and Drainage Study was developed in conjunction with this master plan update. Proposed development was provided to LPA drainage engineers for their initial review. Because of limited on-airport drainage piping, potential impacts associated with each alternative are outlined below.

All Alternatives

- Proposed extension of Runway 14-32 and Taxiway B would likely impact one or more established drainage ditches or swales north of the airfield because of FAA safety and operating requirements.
- Proposed widening of Taxiway A and associated taxiway safety areas would impact drainage ditches adjacent to Runway 10R-28L and Pond I
- Widening of Taxiway C and associated taxiway safety areas would impact drainage ditches to the west
- Installation of approach lighting will require an assessment of potential impacts in conjunction with associated permitting and mitigation.
- Relocation of Taxiway D-1 and construction of the ARFF Emergency Management Facilities west of the existing ARFF facilities would require additional dry ponds to accommodate increased impervious surface and storm water requirements.
- Proposed Key Air development may impact Scrub Jay mitigation areas and existing storm water drainage ditches.
- Any proposed development/impervious surface would require water treatment and drainage as part of development (estimate 1 acre impervious to 2 acres drainage (dry pond)), and
- Permitting is required for all development.

Alternative 1

- Displaced landing threshold on Runway 32 would require that either the existing drainage ponds be decreased in size because of FAA safety and operating requirements or be relocated. Either option decreases the amount of available storm water treatment area.

Alternative 2A

- The extension of Taxiway A to provide access to the Airport West Commerce Park would impact the existing drainage canal west of the runway. An extension would either require



the relocation of the canal or the addition of a culvert. This will require coordination with SFWMD and the Corps of Engineers to obtain required permitting.

- Replacing a portion of Taxiway E, between Taxiway A and Runway 28L, with a new connector Taxiway A-1 thereby providing a 90 degree access point to the threshold of Runway 28L would decrease the amount of storm water mitigation needed to support impervious surface run-off. This is because the portion of pavement (impervious surface) recommended to be removed is expected to be more than the replacement pavement.
- In addition, the property north of the Key Air Leasehold and south of Taxiway A could be used as a dry pond to accommodate planned Key Air development.
- The West GA Apron will impact some identified wetland areas and will require additional storm water treatment to accommodate additional impervious surface areas. Also, the proposed area is low, so ponding and drainage may be difficult.
- The extension of Taxiway C and associated holding pad will impact various storm water treatment areas between Runway 10R-28L as well as requiring additional treatment volume.

Alternative 2B

- North-South Taxiway impacts identified wetland areas and will require that the drainage canal be relocated or a culvert built to accommodate new taxiway. Additional drainage area will also be required to accommodate additional impervious surface.
- The extension of Taxiway A-3 will impact storm water drainage canals north of Runway 10R-28L. However, the increase in impervious surface compared to the extension of Taxiway C is considered less of an impact.

Alternative 3

The large increase in impervious surface associated with runway, taxiway and apron construction would require significant improvements to existing outfall ditches and drainage structures and the construction of additional structures to accommodate demand will be required throughout the twenty year planning period. Extensive permitting and coordination with agencies will also be required.

- Extension of Runway 10R, Taxiway A and proposed north parallel taxiway likely to impact drainage possibly requiring the canal to be relocated or two drainage culverts to be constructed.
- With the addition of several aprons and associated facilities to accommodate general aviation and commercial demand, additional drainage facilities and outfall ditches will be required to accommodate the anticipated increase in impervious surface.
- Drainage improvements will be required to support the proposed expansion/construction of electrical vault, ARFF facilities, access roads, etc.



- As in Alternative 1, the relocation of the landing threshold on Runway 32 could impact the drainage ponds near the threshold of Runway 32. Thus, relocation of existing drainage outfalls may be required.

Further, since a main storm water conveyance adjacent to St. Lucie Blvd is under the jurisdiction of Ft. Pierce Farms, permits will need to be obtained from both the South Florida Water Management District and Ft. Pierce Farms associated with development on the south side of the airport property. Specific recommendations will be provided in **Chapter 6, *Refined Alternative Analysis***, based upon TAC and Board of County Commissioner approved development.

5.8.5 Operational Effectiveness

Compatible with Long-Range Airfield Requirements

This factor evaluates potential operational problems that may exist over the long-term development of the airfield. By assuring airfield components meet the needs of activity generators, the efficiency of the airport is maintained.

Roadway and Utility Access to Potential Development Areas

This factor addresses the ability of the existing roadway network and utility infrastructure to accommodate the proposed land use plan. Since it is truly impossible to accurately predict operational demand for more than ten years, it is likely that neither alternative 1 nor 2 will have a major impact, at least initially, on the existing roadway system. However, development associated with Alternative 3, Air Carrier Commercial Development, will require significant coordination with St. Lucie Transportation Planning and Planning and Development Services departments.

5.8.6 Safety Considerations

Compatibility with Airport Operations Areas and FAR Part 77 Surfaces

This factor examines the ultimate impact to airfield compatibility, with a keen interest in preserving and enhancing safety and impacting navigable airspace. All alternatives meet Part 77 requirements and, therefore, do not impact the Airport Operating Area (AOA).

Airport Security

This factor evaluates each concept's potential to preserve or enhance safety and security on the airfield. With their proposed layouts, all concepts maintain a high level of safety and security on the airfield.



5.8.7 Community Recommendations/Acceptance

Likelihood of Public Acceptance

This factor evaluates the probability of community acceptance of the proposed development based upon the levels of service and long-term role of the airport within St. Lucie County.

Compatible with Adjacent Land Use

Adjacent property development will significantly impact future airport growth. Thus, the ultimate airport development plan not only must support the functionality of the airport facility but also maintain a synergistic and compatible relationship with its neighbors.

5.8.8 Summary Findings

Based upon these requirements, a comparison matrix outlining the strengths and weaknesses of each alternative option, as illustrated in **Table 5-24**, was developed and presented to the Technical Advisory Committee during the October 14, 2009 Workshop.

Based upon intensive discussion, a vote was taken in which all attending (13 of 15) TAC members approved of **Alternative 2A**, *Limited Commercial Development*, as a base for future airport development. The TAC members also voted to preserve property as illustrated in Alternatives 2B and 3 for future aviation development. However, preservation of property must be carefully worded in both the master plan update and County Comprehensive Plan to clearly state that future development will be based upon demand.

This information was presented to the general public during a meeting on October 15, 2009, and was also presented to the Board of County Commissioners at an informal BOCC workshop on December 7, 2009. At that time, the Board requested an additional workshop be held on February 1, 2010 to obtain more public input with regard to proposed future development. During this meeting, additional support was obtained from the remaining TAC members and the general public. As a result, the Board of County Commissioners approved the TAC recommendation. A detailed evaluation of the preferred alternative analysis is provided in **Chapter 6**, *Refined Alternative Analysis*.



**TABLE 5-24
AIRPORT ALTERNATIVE MATRIX**

	Alternative 1: General Aviation Only	Alternative 2A: Limited Commercial Passenger Service	Alternative 2B: Regional Commercial Passenger Service	Alternative 3: Air Carrier Commercial Passenger Service
Strengths	<ol style="list-style-type: none"> 1. Accommodates a variety of aviation operations including flight training, corporate aircraft, fractional ownership, Part 135 On-Demand Air Taxi and Air Charter Operations, government, emergency relief, etc. operating requirements. 2. Provides visual approach aids 3. Based upon forecast demand, anticipate decreased noise impacts to surrounding communities. 4. Taxiway A extension provides access from Airport West Commerce Park 5. Requires no additional land acquisition 6. Future forecast demand is accommodated throughout planning period. 7. Straightforward planning option 8. Does not require relocation of FPL Power Lines 	<ol style="list-style-type: none"> 1. Accommodates limited commercial/commuter service (50 seats or less) 2. Accommodates GA operating requirements. 3. Provides visual and navigational approach aids 4. Taxiway A extension provides access from Airport West Commerce Park 5. Development is limited to existing airfield 6. Future forecast demand is accommodated throughout planning period. 7. Unanticipated limited passenger service demand accommodated. 8. Does not require relocation of Power Lines 9. Does not impact mitigation areas. 	<ol style="list-style-type: none"> 1. Accommodates regional, corporate and general aviation operations. 2. Decreases visibility minimums on Runway 10R to ½ statute mile 3. Increases ARFF Index 4. Likely to increase use of Runway 10L-28R by training aircraft 5. Provides taxiway between Runway 10R-28L and 10L-28R 6. Provides additional navigational/weather equipment (Transmissometer); improving safety 7. Allows for aviation development between Runway 10R-28L and 10L-28R 8. Obtains control of Runway 32 Approach RPZ 9. Does not require any runway extensions 10. Does not impact any existing on-airport mitigation areas 	<ol style="list-style-type: none"> 1. Accommodates all aircraft operations. 2. Lowers visibility to ½ Statute Miles 3. Increases existing leaseholds and revenue sources 4. Provides additional visual, navigational and weather aids 5. Provides the greatest flexibility for future development. 6. Allows for continued airport growth 7. Unanticipated demand is accommodated throughout the planning period 8. Increases ARFF Index 9. Likely to increase use of Runway 10L-28R by training aircraft 10. Provides taxiway between Runway 10R-28L and 10L-28R 11. Provides additional navigational/weather equipment (Transmissometer); improving safety 12. Allows for aviation development between Runway 10R-28L and 10L-28R 13. The majority of the most developable land has been allocated for future use



Weakness	<ol style="list-style-type: none"> 1. Wetland Mitigation and drainage improvements required. 2. Environmental Restoration Program and Environmental Assessment required. 3. No provisions for unforeseen demand 4. Displaced threshold will impact drainage and limit runway length on Runway 14-32 5. Visibility on Runway 10R limited to ¼ statute mile. 	<ol style="list-style-type: none"> 1. Wetland Mitigation and drainage improvements required. 2. Environmental Documentation required (EA, EIS, etc). 3. Visibility on Runway 10R limited to ¼ statute mile – Alternative 2A. 4. Requires relocation of FPL power lines – Alternative 2B 5. Impacts drainage canals. 6. North Taxiway may require relocation of Glide slope antenna and impact POFA 	<ol style="list-style-type: none"> 1. Requires relocation of Power Lines 2. Wetland and drainage improvements required 3. Environmental Documentation including ERP, EA and various permitting required 4. May limit development of some properties within West Airport Commerce Park 5. Impacts Pond I and main drainage conveyance ditches 6. Will likely require relocation of existing glide slope to limit impact to POFA 7. Require additional ARFF equipment and materials. 8. Additional airport personnel required 	<ol style="list-style-type: none"> 1. Expanded ARFF Facilities and Equipment needed 2. Internal Perimeter Road 3. Extensive environmental documentation (EIS), permitting and mitigation. 4. Extensive drainage improvements associated with relocation or culvert of canals, increased impervious surface, etc. 5. Displaced threshold will impact drainage and limit runway length on Runway 14-32 6. Development requires relocation of current mitigation areas either to other locals on the airport or off airport property 7. May restrict building heights within Airport West Commerce Park 8. Requires relocation of FPL Power Lines 11. Requires relocation of Airport Terminal Facilities 12. Requires relocation of Tree Mitigation Areas
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