Airport Master Plan

Prepared for
Flagler County Airport

By
C&S Engineers, Inc.
605 East Robinson Street, Suite 210
Orlando, Florida 32801-2037

November 2015

FAA AIP No. 3-12-0009-014-2012
FDOT No. 404970-1

“The preparation of this document was financed in part through a planning grant from the Federal Aviation Administration as provided in the Airport and Airway Improvement Act of 1982, as amended. The contents of this report reflect the analysis and finding of C&S Engineers, Inc. who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable with applicable Public Laws.”
# TABLE OF CONTENTS

**CHAPTER 1 - INTRODUCTION**  ................................................................................................. 1-1

1.01  PLANNING SCOPE AND OBJECTIVES ................................................................. 1-1
1.02  THE PLANNING PROCESS .................................................................................. 1-2

**CHAPTER 2 - EXISTING CONDITIONS** .............................................................................. 2-1

2.01  AIRPORT SETTING ............................................................................................. 2-1
   2.01-1 History and Administration ................................................................. 2-1
   2.01-2 Surrounding Features ........................................................................... 2-2
   2.01-3 Growth Characteristics ......................................................................... 2-2
   2.01-4 System Planning Roles ........................................................................... 2-3
   2.01-5 Climate and Wind Data .......................................................................... 2-4
2.02  AIRFIELD ENVIRONMENT .................................................................................. 2-6
   2.02-1 Aircraft Movement Areas ........................................................................ 2-6
   2.02-2 Instrument Approaches ........................................................................... 2-11
   2.02-3 Airfield Lighting ..................................................................................... 2-13
   2.02-4 Pavement Markings ................................................................................ 2-14
   2.02-5 Airfield Signage ..................................................................................... 2-15
   2.02-6 Takeoff and Landing Aids ....................................................................... 2-15
2.03  AIRSPACE AND AIR TRAFFIC CONTROL ......................................................... 2-16
2.04  AIRPORT FACILITIES ......................................................................................... 2-17
   2.04-1 General Aviation Terminal ...................................................................... 2-17
   2.04-2 Hangars ................................................................................................... 2-18
   2.04-3 Aircraft Parking Aprons .......................................................................... 2-20
   2.04-4 Aviation Fuel Supply and Service ......................................................... 2-21
   2.04-5 Support and Service Facilities ............................................................... 2-21
   2.04-6 Airport Infrastructure .............................................................................. 2-22
   2.04-7 Non-Aviation Facilities .......................................................................... 2-23
2.05  HISTORIC AVIATION ACTIVITY ...................................................................... 2-23
   2.05-1 Based Aircraft ......................................................................................... 2-23
   2.05-2 Annual Operations .................................................................................. 2-23
   2.05-3 Fuel Sales .............................................................................................. 2-24
2.06  CONCLUSION ....................................................................................................... 2-24

**CHAPTER 3 - FORECASTS OF AVIATION DEMAND** ...................................................... 3-1

3.01  CONSIDERATIONS FOR PROJECTING DEMAND ............................................. 3-1
   3.01-1 Elasticity of General Aviation Industry ................................................. 3-1
   3.01-2 Recent Projections of Aircraft and Activity ....................................... 3-2
3.01-3 Current Industry Indicators ................................................................. 3-4
3.02 FORECAST OF BASED AIRCRAFT ................................................... 3-5
  3.02-1 Current Aircraft Based at Flagler ..................................................... 3-5
  3.02-2 Historic Growth .............................................................................. 3-6
  3.02-3 Previous Growth Projections .......................................................... 3-6
  3.02-4 National Active Fleet Forecasts ..................................................... 3-7
  3.02-5 Regression Analysis ...................................................................... 3-7
  3.02-6 Selected Based Aircraft Forecast .................................................. 3-8
3.03 FORECAST OF BASED AIRCRAFT FLEET MIX ................................ 3-9
  3.03-1 The Nation’s Active General Aviation Fleet ...................................... 3-9
  3.03-2 Flagler County Airport Based Aircraft Fleet Mix ............................. 3-10
3.04 FORECAST OF ANNUAL AIRCRAFT OPERATIONS ...................... 3-11
  3.04-1 Historic Growth .............................................................................. 3-12
  3.04-2 Previous Growth Projections .......................................................... 3-12
  3.04-3 Utilization of the General Aviation Fleet ......................................... 3-13
  3.04-4 Projection by Type of Operation ..................................................... 3-13
  3.04-5 Market Share .................................................................................. 3-14
  3.04-6 Omitted Forecast Methodologies ................................................... 3-14
  3.04-7 Selected Forecast of Aircraft Operations ........................................ 3-15
3.05 TYPES OF AIRCRAFT OPERATIONS ............................................... 3-17
  3.05-1 Local versus Itinerant Split ............................................................. 3-17
  3.05-2 Instrument Operations .................................................................... 3-18
  3.05-3 Operational Fleet Mix ..................................................................... 3-18
  3.05-4 Peak Activity Estimates ................................................................. 3-19
3.06 FAA TERMINAL AREA FORECAST COMPARISON ....................... 3-20
3.07 DEMAND FORECAST SUMMARY .................................................... 3-21

CHAPTER 4 - CAPACITY ASSESSMENT AND FACILITY REQUIREMENTS..... 4-1
4.01 AIRPORT CAPACITY .......................................................................... 4-1
  4.01-1 Airfield Geometry ......................................................................... 4-1
  4.01-2 Operational Characteristics ........................................................... 4-3
  4.01-3 Meteorological Conditions ............................................................ 4-5
  4.01-4 Airfield Capacity Calculations ........................................................ 4-6
  4.01-5 Recommendations for Capacity Enhancement ......................... 4-8
4.02 AIRPORT DESIGN CRITERIA .............................................................. 4-9
  4.02-1 Runway Reference and Design Codes .......................................... 4-9
  4.02-2 Critical Design Aircraft ................................................................. 4-10
  4.02-3 Taxiway Design Groups ................................................................. 4-12
4.03 RUNWAY REQUIREMENTS ................................................................. 4-12
  4.03-1 Additional Capacity ...................................................................... 4-12
  4.03-2 Runway Length Analysis ............................................................... 4-14
  4.03-3 Runway Width Requirements .......................................................... 4-20
4.03-4  Runway Pavement Strength .................................................. 4-21
4.03-5  Runway Safety Criteria ......................................................... 4-22
4.03-6  Line of Sight Requirements .................................................. 4-25
4.04  TAXIWAY SYSTEM REQUIREMENTS........................................... 4-25
4.04-1  Taxiway A ........................................................................... 4-26
4.04-2  Taxiway B ........................................................................... 4-26
4.04-3  Taxiway C ........................................................................... 4-27
4.04-4  Taxiway D ........................................................................... 4-27
4.04-5  Taxiway E ........................................................................... 4-27
4.04-6  Hangar Taxilanes ................................................................. 4-28
4.04-7  New Taxiways and Taxilanes ................................................ 4-28
4.04-8  Run-Up Areas ..................................................................... 4-29
4.05  NEW INSTRUMENT APPROACH PROC EDURES ..................... 4-29
4.05-1  Precision Approaches ........................................................... 4-30
4.05-2  Approach Procedures with Vertical Guidance ..................... 4-31
4.05-3  Non-Precision Approaches ................................................... 4-32
4.05-4  FAR Part 77 Imaginary Surfaces .......................................... 4-32
4.06  AIRFIELD ENVIRONMENT.......................................................... 4-34
4.06-1  Runway Lighting .................................................................. 4-34
4.06-2  Taxiway Lighting .................................................................. 4-35
4.06-3  Pavement Markings ............................................................... 4-35
4.06-4  Airfield Signage ................................................................. 4-38
4.06-5  Takeoff and Landing Aids .................................................... 4-38
4.07  AIRPORT FACILITIES................................................................. 4-40
4.07-1  General Aviation Terminal Space Requirements ................. 4-40
4.07-2  Aircraft Hangar Requirements ............................................. 4-42
4.07-3  Aircraft Parking Apron Requirements .................................. 4-43
4.07-4  Aviation Fuel Supply and Service ....................................... 4-45
4.07-5  Electrical Vault .................................................................... 4-46
4.07-6  Aircraft Rescue and Fire Fighting ....................................... 4-46
4.07-7  Heliports ............................................................................ 4-46
4.07-8  Seaplane Facilities ............................................................... 4-48
4.08  LANDSIDE ACCESS, AUTOMOBILE PARKING, AND UTILITY INFRASTRUCTURE ......................................................... 4-49
4.08-1  Landside Access ................................................................. 4-49
4.08-2  Automobile Parking ............................................................. 4-50
4.08-3  Utility Infrastructure ............................................................. 4-50
4.09  WILDLIFE HAZARD SITE VISITS AND ASSESSMENTS............ 4-50
4.10  MASTER STORMWATER MANAGEMENT PLAN ..................... 4-51
4.11  POLLUTION PREVENTION PLANS ......................................... 4-51
4.12  LAND ACQUISITION ................................................................. 4-52
4.13  SUMMARY OF FACILITY REQUIREMENTS............................. 4-53
CHAPTER 5 - ALTERNATIVES FOR AIRPORT DEVELOPMENT

5.01 PRIMARY INSTRUMENT RUNWAY
5.01-1 Change in Guidance for Runway Protection Zones
5.01-2 Runway End Siting
5.01-3 Ultimate Length of Runway 11-29
5.01-4 Land Acquisition Considerations

5.02 NEW PARALLEL RUNWAY
5.02-1 Factors Effecting Development Options
5.02-2 Initial Parallel Runway Options
5.02-3 Selected Parallel Runway Alternative

5.03 TAXIWAYS AND RUN-UP AREAS
5.03-1 Parallel Taxiway Systems
5.03-2 Connector / Exit Taxiways
5.03-3 Run-up Areas

5.04 AIRPORT FACILITIES
5.04-1 Development Areas
5.04-2 Planning and Design Elements for Alternatives
5.04-3 General Aviation Terminal Sites
5.04-4 Aircraft Hangars
5.04-5 Aircraft Parking Apron Space
5.04-6 Aviation Fuel Storage Areas
5.04-7 Electrical Vault
5.04-8 Public Heliport Facility
5.04-9 Seaplane Facilities

5.05 NON-AVIAATION RELATED DEVELOPMENT
5.05-1 Flagler County Industrial Market Assessment
5.05-2 Areas Available for Non-Aviation Uses
5.05-3 Foreign Trade Zone Status

5.06 REFINEMENT OF SELECTED ALTERNATIVES
5.06-1 Redevelopment of Runway 11-29 Flightline
5.06-2 Development of Runway 06-24 Flightline

5.07 SUMMARY OF DEVELOPMENT ALTERNATIVES

CHAPTER 6 - AIRPORT LAYOUT PLAN DRAWINGS

6.01 GENERAL
6.02 DRAWING SET
6.02-1 Airport Layout Plan
6.02-2 Terminal Area Plans
6.02-3 Future FAR Part 77 Airspace Surfaces
6.02-4 Inner Portion of the Approach Surface Plans
6.02-5 Exhibit A Airport Property Inventory Map
CHAPTER 7 - CAPITAL IMPROVEMENT PROGRAM................................. 7-1

7.01 GENERAL ......................................................................................... 7-1
7.02 SOURCES OF FUNDING FOR IMPROVEMENTS............................. 7-1
  7.02-1 Federal Aviation Administration ............................................ 7-1
  7.02-2 Florida Department of Transportation................................. 7-2
  7.02-3 Economic Development and Other Sources ..................... 7-2
7.03 AIRPORT DEVELOPMENT PROGRAM ........................................... 7-3
  7.03-1 Current Airport Projects........................................................... 7-4
  7.03-2 Short Term Capital Improvement Program ......................... 7-4
  7.03-3 Intermediate Term Capital Improvement Program........... 7-6
  7.03-4 Long Term Capital Improvement Program ......................... 7-7
7.04 SUMMARY........................................................................................ 7-8

APPENDICES

APPENDIX A ENVIRONMENTAL CONDITIONS
APPENDIX B PROJECT DEFINITION STUDY FOR POTENTIAL NEW PARALLEL RUNWAY
APPENDIX C PROJECT COORDINATION
CHAPTER 1 - INTRODUCTION

Airports receiving development grants from the Federal Aviation Administration (FAA) and Florida Department of Transportation (FDOT) are required to conduct periodic updates of their planning documents. In December of 2012, the Flagler County Board of County Commissioners began the process to update their master plan for the Flagler County Airport in Palm Coast, Florida. Since the previous master plan was completed in 2005, a number of facilities and improvements have been made at the airport, including construction of an airport traffic control tower (ATCT).

The 2005 Airport Master Plan Update was based on forecasts which utilized historic data up to 2003 when the facility was a non-towered airport. The official activity recorded by the ATCT shows the previous master plan forecasts and assumptions regarding the operations conducted at the airport are no longer valid. This master plan updates those projections and takes a new look at the airport requirements as well as development issues for both aviation related and non-aviation related facilities. The study will include a significant on-airport land use component while also providing an entirely new Airport Layout Plan Drawing set.

1.01 PLANNING SCOPE AND OBJECTIVES

The airport’s master plan serves a variety of functions, including providing a tool for financial planning and guiding adjacent land uses. Consequently, the primary goal of this master plan is to create a 20-year development program that maintains a safe, efficient, and environmentally acceptable airport facility. To achieve this goal, the document should provide guidance to satisfy the aviation demand in a financially feasible and responsible manner. As such, the following objectives were included:

- Identifying the needed airside, landside, and airspace improvements and recommend options to further optimize the economic aspects of the airport while enhancing the safety and operational capability.
- Identifying short term requirements and recommend actions to optimize funding opportunities.
- Ensuring that short term actions and recommendations do not preclude long range planning goals.
- Incorporating the interests of the public and government agencies into the planning process.
- Remaining sensitive to the overall environmental characteristics and needs of the area surrounding the airport.
Creating options that are compatible with existing and future land uses (both on- and off-airport property).

Establishing an implementation schedule for short, intermediate, and long term improvements and insure that they are financially feasible.

As illustrated above, the airport is not simply a standalone facility, rather part of the overall community. As such, future developments identified in this study consider potential community impacts and multiple opportunities were available for community and governmental representatives to participate in the process.

1.02 THE PLANNING PROCESS

This master plan provides a systematic outline of the development actions required to maintain and further develop airfield and landside facilities. This process provides the officials responsible for the scheduling, budgeting, and ultimate funding of airport improvement projects with an advance notice of the airport’s future needs. By phasing the airport improvements, the development can be conducted in an orderly and timely fashion.

This master plan was prepared in accordance with FAA Advisory Circular (AC) 150/5070-6B, Change 2, *Airport Master Plans* and FDOT *Guidebook for Airport Master Planning*. It is also consistent with Chapter 14-60 of the Florida Administrative Code and other applicable FAA or FDOT guidance, including FAA AC 150/5300-13A, Change 1, *Airport Design*.

Throughout this process, reviews were conducted to insure input was received from key stakeholders, including the Board of County Commissioners, Airport Advisory Board, County staff, ATCT management, FAA, FDOT, airport tenants, and users. The individual steps in the master plan process are built upon information and decisions made during previous steps. Taken as a whole they address the objectives identified above.
CHAPTER 2 - EXISTING CONDITIONS

Information about the existing conditions of the airport and the immediate surrounding community is included to provide a foundation for subsequent analyses throughout the study. This includes an examination of existing airport facilities, aviation activity, and environmental features of the area, as well as general information regarding the airport setting.

2.01 AIRPORT SETTING

The airport is located on the east side of Flagler County, Florida, just west of Interstate 95. Situated just south of State Road (SR) 100, the airfield is also bounded by Seminole Woods Parkway on the east, the Iroquois Canal to the south, and Belle Terre Boulevard on the west. Interstate 95 is just a little over a mile east of the airport with a full interchange for SR 100. U.S. Highway 1 is approximately three miles east of the airport running through the City of Bunnell, which is the County seat.

The airport comprises 1,300 acres of relatively flat land with a published airfield elevation of 33 feet above mean sea level. While the airport is entirely within unincorporated Flagler County, much of the property directly borders with the City of Palm Coast. The airport is about 24 miles north of Daytona Beach and 70 miles south of Jacksonville. Bordering counties include St. Johns County to the north, Volusia County to the south and Putnam County to the west.

2.01-1 History and Administration

Constructed by the U.S. Navy, the initial airfield was commissioned on August 1, 1945 as the Bunnell Naval Outlying Landing Field (NOLF). The original layout included four paved runways to support training operations from both the Daytona Beach and Jacksonville Naval Air Stations. After the war effort, the airfield was transferred from the U.S. Navy to Flagler County on April 21, 1947 to become a public-use general aviation airport.

As the official Airport Sponsor, Flagler County’s Board of County Commissioners is responsible for the operation and maintenance of the facilities. They accomplish this through the County Administration’s Airport Department. The Airport Director and his staff have the direct responsibility of managing the airport facilities, property, and operations. The Board of County Commissioners also appoints a five member Airport Advisory Board to assist in making recommendations on airport related issues.
2.01-2 Surrounding Features

The airport property has an existing and future land use designation of industrial, while the surrounding land includes residential and mixed uses both now and in the future. The residential areas are primarily located west of Belle Terre Boulevard, east of Seminole Woods Parkway, and south of the Iroquois Canal. On the north side of State Road (SR) 100 the mixed uses include the Flagler-Palm Coast High School directly across from the airport entrance and the Florida Hospital Flagler to the northeast. There are also a few places of worship along SR 100 near the airport.

In July 2009, the final Palm Coast / Flagler County Airport Area Master Plan was released. This document was adopted by the City of Palm Coast to facilitate the future economic and development growth of approximately 14,000 acres surrounding the airport. Over the last five years, development actions near the airport have been associated with the Town Center development, just north of the airport on the other side of SR 100. Town Center is a 1,557 acre mixed use Planned Unit Development that will ultimately create a downtown area for the City of Palm Coast. Completed projects include the Palm Coast Landing shopping center, Brookhaven residential units, EPIC Theatres, Hilton Garden Inn, and office buildings. Current and foreseeable future plans include additional residential, commercial, and public uses as approved in the Town Center Development of Regional Impact.

Various features of the airport property and surrounding area have been documented in two recent FAA Environmental Assessments (EA). The Runway 06-24 Safety Area Improvements EA was completed in February 2012 when the FAA issued a Finding of No Significant Impact (FONSI). And the Near Term Capital Improvements EA was completed in December 2009 and also resulted in a FONSI. Both of these documents address the 23 impact categories outlined in the FAA’s Environmental Desk Reference. A summary of the information detailed in these studies has been included as Appendix A – Environmental Conditions.

2.01-3 Growth Characteristics

Since the last airport master plan, the population for Flagler County has had an average growth of 5.9 percent growth each year, exceeding Florida’s overall average growth of 1.4 percent per year for the same period. Population projections from the University of Florida’s Bureau of Economic and Business Research (BEBR) are provided for each county in Florida. Based on these, the population of Flagler County is expected to increase from 96,241 in 2011 to 181,070 by 2033. This represents an average annual growth of 2.9 percent, which is also above that expected for the state (1.1 percent).

For the last ten years of data available, the median household income in Flagler County has increased from $39,132 in 2001 to $45,685 in 2010. This represents an average growth of 1.7 percent annually, which is just below the historic growth for
the state. The Flagler County Department of Economic Opportunity projects the median household income to continue to grow 1.3 percent annually, through 2016.

Historic data from the University of Florida BEBR shows that the number of households in Flagler County grew from 24,270 in 2002 to 39,409 in 2011. The Flagler County Department of Economic Opportunity expects this number to continue to increase, but not at the same rate. In fact the historic average annual growth of 5.5 percent has been reduced to 1.2 percent for the future. To the east, west, and south of the airport, most of the residential communities have remained relatively unchanged, with only a few new units constructed since the last master plan. Given the current housing market, no substantial growth is expected in the short term. Some commercial development is planned to occur between the airport property and Seminole Woods Parkway, while the Army National Guard plans to build a facility to the south of the airport on the east side of Belle Terre Boulevard.

Improvement projects at the airport since the last master plan have included the construction of new aircraft hangars with office space, office buildings, an airport traffic control tower, re-marking of airfield pavements, security fencing, an on-airport cell tower, t-hangar buildings, automated weather station, reconstruction/expansion of aircraft parking areas, and an access road into the south side of the airport.

2.01-4 System Planning Roles

Airport planning occurs at local, statewide, and national levels, each with its own particular emphasis. The update of the airport master plan provides planning at the local level, while statewide matters are addressed by the Florida Department of Transportation (FDOT), and national issues by the Federal Aviation Administration (FAA).

FLORIDA AVIATION SYSTEM PLAN

In order to facilitate FDOT’s strategic planning for the state’s aviation system, the Florida Aviation System Plan (FASP) 2025 was completed in 2005. This document is continually updated through the Continuing Florida Aviation Systems Planning Process (CFASPP) and divides the state’s public-use airports into nine regions. Flagler County Airport is one of 22 airports in the East Central Florida region.

As the second most populated, this region has a significant level of tourism due to the various theme parks, beaches, and other major area attractions. These as well as other industries are supported by four commercial service airports: Daytona-Beach, Melbourne, Orlando, and Orlando-Sanford International Airports. Flight training is also very significant with many of the nation’s largest flight schools and aeronautical universities located at a number of the airports in the region. In addition to the public-use facilities, there are numerous private airfields, as well as Cape Canaveral
Flagler County Airport Master Plan

Air Force Station Skid Strip, Patrick Air Force Base, and the Shuttle Landing Facility at Kennedy Space Center in the region.

The state system plan designates facilities as either commercial or general aviation airports and then subcategorizes them based on the role they serve. The most recent system plan update (2012 FASP) lists Flagler County as a general aviation airport serving all roles of the general aviation industry.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS

A National Plan of Integrated Airport Systems (NPIAS) is presented every two years to Congress by the Secretary of Transportation for the development of public-use airports which are significant to the national air transportation system. Specifically, this plan documents the federal aid required for infrastructure development at the nation’s commercial service, reliever (high capacity general aviation airports), and other select general aviation airports. The categorization of these needs guides FAA management in their administration of the Airport Improvement Program.

The most recent NPIAS (2013-2017) introduced four categories for general aviation airports, including relievers. The categories of national, regional, local, and basic are based on a facility’s number and type of based aircraft, as well as the volume and types of operations served. These categories do not change any eligibility for federal funding; rather they are designed to further assist the FAA in determining the types of development appropriate. For each new category, the NPIAS shows the greatest need is to bring airports up to the current design standard while the second biggest is for replacing or rehabilitating pavement and lighting systems. In the 2013-2017 NPIAS, Flagler County is designated as a regional general aviation facility with $24.2 million in eligible improvement costs over the five year period.

2.01-5 Climate and Wind Data

Weather plays an important role in the operation of aircraft; therefore, the area’s climate and wind characteristics are documented in the following sections for use in later analyses of this study.

CLIMATE

Flagler County is located along the northeast coast of Florida. As with most of Florida’s east coast, the surrounding land is relatively flat. The airfield has an established elevation of 33 feet above mean sea level and is located just five miles inland from the Atlantic Ocean. These characteristics, the maritime location, and prevailing easterly sea breeze significantly influence the climate and prevailing winds for this region.
Although the airport is located in the warmer southeastern portion of the nation, annual temperatures are considered moderate due to the influence of the sea breeze. Temperatures during the summer months rarely reach 100 degrees Fahrenheit; with an average maximum temperature of 91 degrees Fahrenheit in both July and August. During the winter months, the average minimum temperature is 46 degrees Fahrenheit in January. Rainfall in this area occurs during all seasons; however, it is more abundant during the summer when daily showers are common. The County averages approximately 49 inches of rainfall on an annual basis.

**WIND CHARACTERISTICS**

Historical wind conditions were evaluated to determine the percentage of wind coverage for the airport’s runway system. This element is important since aircraft takeoff and land into the wind. The FAA recommends that sufficient runways be provided to achieve 95 percent wind coverage, which is computed based on a crosswind not exceeding 10.5 knots (12 mph) for aircraft with a Runway Design Code (RDC) of A-I and B-I; 13 knots (15 mph) for RDC A-II and B-II; 16 knots (18 mph) for RDC A-III, B-III and C-I through D-III; and 20 knots (23 mph) for RDC A-IV through E-VI. If 95 percent wind coverage is not provided at an airport for the maximum crosswind component, then a crosswind runway should be considered. The existing and future critical aircraft for Flagler County, as well as the associated RDC criteria, are addressed in the facility requirements chapter.

<table>
<thead>
<tr>
<th>TABLE 2-1</th>
<th>WIND COVERAGE ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crosswind Component</td>
</tr>
<tr>
<td>All Weather Conditions</td>
<td>Runway 11-29</td>
</tr>
<tr>
<td></td>
<td>Runway 06-24</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
</tr>
<tr>
<td>VFR Conditions (ceiling &gt; 1,000 feet and visibility &gt; 3 miles)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Runway 11-29</td>
</tr>
<tr>
<td></td>
<td>Runway 06-24</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
</tr>
<tr>
<td>IFR Conditions (ceiling 200 to 1,000 feet and visibility 0.5 to 3 miles)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Runway 11-29</td>
</tr>
<tr>
<td></td>
<td>Runway 06-24</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.
FAA Advisory Circular (AC) 150/5300-13A, Change 1, *Airport Design* recommends that ten consecutive years of wind data be examined when carrying out an airfield wind coverage evaluation. If onsite data is not available, it is recommended that data from the closest airport(s) be utilized as a substitute. Wind coverage calculations also need to take into account the different ceiling and visibility minimums associated with aircraft operations. Therefore, data for all weather, visual flight rule (VFR), and instrument flight rule (IFR) conditions were analyzed. In this case, Daytona Beach International was the closest airport with ten years of data and similar geographic characteristic to those of Flagler. The data was used to calculate the 10.5, 13, and 16 knot crosswind components using the FAA’s online Standard Wind Analysis tool.

### 2.02 AIRFIELD ENVIRONMENT

The following sections provide information regarding the facilities that exist to accommodate aircraft operations. While this most certainly includes the airport’s runway and taxiway system, it also includes the available instrument approaches; airfield lighting; takeoff and landing aids; pavement markings; and airfield signage. The facilities described are identified on **Figure 2-1**.

#### 2.02-1 Aircraft Movement Areas

The aircraft movement areas include any paved or unpaved surfaces that enable aircraft to move to and from the runway environment. In addition to the physical characteristics of the runway and taxiway environment, there are other safety-related criteria. The specific criteria for each of these protective surfaces will be discussed in subsequent chapters.

**RUNWAY 11-29**

The primary runway, Runway 11-29, is 4,999 feet in length and 100 feet in width. Constructed of asphaltic concrete, the most recent major improvement to the pavement surface was an asphalt overlay that was conducted in 1989. In 2008, FDOT published a pavement report for Flagler County based on surveys and field work conducted in 2007. The Pavement Condition Index (PCI) assigned to Runway 11-29 at that time resulted in a fair rating. The study predicted the PCI rating for Runway 11-29 to become poor in 2008 and very poor by 2014.

A visual inspection of the runway in 2012 confirmed that the runway pavement is deteriorating with areas of significant linear and transverse cracking, as well as some areas of raveling and vegetative growth. Despite the condition, the weight bearing capacity for the runway continues to be published as 60,000 pounds for aircraft with single wheel type landing gear. However, the source of the runway pavement strength rating could not be determined.
The runway also has 50 foot paved shoulders on each side of the full strength pavement width. These shoulders exist from the original runway width of 200 feet which has not been maintained for some time. The shoulder pavement exhibits significant block cracking, vegetative growth, some crumbling pavement, and patched trenches for the individual runway lighting cables.

**RUNWAY 06-24**

Runway 06-24 is the crosswind runway that has a published length of 5,000 feet and a width of 100 feet. Also constructed of asphalitic concrete, the entire length of this runway was overlaid with asphalt in 1996. The FDOT pavement study assigned PCI ratings that show the asphalt surface to be in satisfactory condition. This was projected to decrease to a fair condition by 2009 and poor by 2015.

Visual inspection of the Runway 06-24 surface in 2012 verifies the FDOT predictions as the runway has areas of significant weathering, cracking, and raveling of the pavement along the entire runway length. As with the primary runway, the weight bearing capacity published for Runway 06-24 is 60,000 pounds for aircraft with single wheel type landing gear, but the source of the rating could not be confirmed.

Runway 06-24 also has 50 foot paved shoulders from the original 200 foot wide runway. The shoulder pavement exhibits significant block cracking, vegetative growth, some crumbling pavement, and patched trenches for the runway lighting cables.

**HELIPORTS**

There is only one heliport area designated on the airfield. This is the private heliport which is a part of the apron in front of the clearspan hangar just east of the t-hangars. This heliport includes markings for a 36 foot square touchdown and liftoff area and a 65 foot square final approach and takeoff area, both in white. Another helicopter operations area is located on the closed portion of Taxiway B, between Taxiway A1 and Taxiway D. While this area includes markings for a 17 foot square touchdown and liftoff area, as well as the standard “H” symbol, both in white, it does not meet the full standards required of a public use heliport as defined by the FAA.
Flagler County Airport Master Plan

RUNWAY 18W-36W

Flagler County has established a water runway on Gore Lake to support seaplane operations. As depicted in Figure 2-1, the sea lane (actual area dedicated for the landing and takeoff run of seaplanes) is 2,875 feet long by 500 feet wide; however the four corners of this area are not physically marked. The established sea lane for the waterway is 22 feet above mean sea level and presently there is a small dock and ramp located on the eastern shore of Gore Lake. Due to line of sight issues, the ATCT has issued a formal Letter to Airmen stating their inability to issue control instructions to any aircraft operating to or from Gore Lake.

TAXIWAY A

Taxiway A is the full length parallel taxiway to Runway 11-29. For the most part the taxiway is 50 feet wide and has a runway centerline to taxiway centerline separation of 525 feet. This width decreases to 35 feet on the west end between Taxiway B and the approach end of Runway 11. The centerline offset increases an additional 12 feet in front of the primary aircraft parking apron in order to maintain wingtip clearance to any aircraft parked on the ramp. The FDOT pavement report documented the average condition of the asphalt taxiway as fair; however, a number of sections were predicted to be in very poor or even serious condition within five years of the study. The visual inspection conducted in 2012 verified these conditions as there are many areas with severe block cracking, raveling, and vegetative growth. Towards the end of 2012, the portion of Taxiway A between the primary and corporate aircraft parking aprons was rejuvenated. This was done as part of the apron projects that year in order to minimize the potential of foreign object debris (FOD) until the taxiway can be properly rehabilitated.

In 2012, the taxiway documented in the FDOT pavement study as Taxiway F was rehabilitated as part of the project to construct the corporate aircraft parking apron. The rehabilitation milled and overlaid the two top inches of asphalt to a width of 50 feet. During the project, new signage was added which officially designates this alignment as Taxiway A1.

TAXIWAY B

Taxiway B is a partial parallel taxiway to Runway 11-29 that runs between the westernmost end of Taxiway A and Taxiway D. Taxiway B lies between Runway 11-29 and Taxiway A with a runway centerline to taxiway centerline spacing of 300 feet. At 35 feet, the asphalt taxiway is in satisfactory condition according to the FDOT pavement report. This rating was projected to decrease to fair by 2009 and the visual inspection conducted in 2012 showed both linear and traverse cracking to confirm this condition. As mentioned in the heliports section, the portion of the
Taxiway B alignment between Taxiway D and Taxiway A-1 (see Figure 2-1) has been closed with barricades as it is used for helicopter operations.

**TAXIWAY C**

Originally the parallel taxiway to the abandoned northwest/southeast runway, Taxiway C bisects the current airfield. The north end intersects Taxiway A, just south of the self-service aircraft fuel area while the south end connects to the approximate midpoint of Runway 06-24. At 50 feet, the asphalt taxiway was given an overall satisfactory rating in the FDOT pavement report. This is a bit misleading as the portion between Runway 11-29 and Taxiway E was scheduled to be rehabilitated in 2007, but the project never happened. Instead, this portion is still similar to the part north of Runway 11-29 and south of Taxiway E, which ranged from fair to poor with projections of poor and very poor, respectively. The visual inspection conducted in 2012 showed severe block cracking, weathering, and vegetative growth along the entire taxiway alignment. The remaining portion of Taxiway C south of Runway 06-24 has been abandoned.

**TAXIWAY D**

Taxiway D was originally constructed as the full length parallel taxiway to the abandoned north/south runway of the navy airfield configuration. Like Taxiway C, this taxiway bisects the current airfield starting at Taxiway A, just east of the primary aircraft parking apron. The alignment intersects Taxiway B, Runway 11-29, Taxiway C, and Taxiway E before ending at Runway 06-24. The portion of Taxiway D south of Runway 06-24 has been abandoned. The asphalt pavement is 50 feet wide and documented in the FDOT pavement report as having an overall fair condition. This is a bit misleading as small portions of the taxiway were rated as poor and serious, with projections of very poor and failed by 2011. The visual inspection conducted in 2012 raised significant concern for the pavement conditions at the intersection just north of Runway 11-29 and the portion between Taxiway E and Runway 06-24. These areas had severe block, linear, and transverse cracking as well as vegetative growth.

**TAXIWAY E**

Taxiway E is the full length parallel taxiway to Runway 06-24. Similar to Taxiway A, most of the taxiway is 50 feet wide and has a runway centerline to taxiway centerline separation of 525 feet. This width decreases to 35 feet on the portion between Runway 11-29 and Taxiway A. Taxiway E also continues on the northeast side of Taxiway A, at a width of 50 feet until it ends at the east aircraft parking apron. The FDOT pavement report documents the average condition of the asphalt taxiway as fair; however, there are many portions that have a much lower rating than the average. The last section which ties into the approach end of Runway 06 and the middle portion between Taxiway D and Runway 11-29 received ratings of very poor and poor. The pavement study predicted these two areas to continue to deteriorate
with some approaching serious conditions. The visual inspection conducted in 2012 verified severe block, linear, and transverse cracking along most of the taxiway, especially in the areas of concern noted above. The portions northeast of Runway 11-29 and Taxiway A are in satisfactory to good condition as they were constructed in 1989 and 2004, respectively.

HANGAR TAXILANES

There are six taxilanes off of Taxiway A that provide access to the five t-hangar buildings and one clearspan hangar. The two westernmost t-hangar taxilanes were constructed in 2012 to a width of 25 feet. The other four are 20 feet wide and were included in the FDOT pavement study. The pavement rating for three of these four taxilanes is satisfactory while the one between the two easternmost t-hangars was considered fair. The prediction was for these pavements to move to fair and poor, respectively. Upon visual inspection, all four of the older taxilanes appeared to be in fair condition with very little cracking or vegetative growth. It should be noted that the easternmost taxilane which serves the t-hangar and clearspan hangar is connected to Taxiway A via an apron area around another hangar. The pavement condition of this apron area is very poor.

2.02-2 Instrument Approaches

During times of inclement weather, instrument approaches enable pilots to safely descend into the airport environment for landing. There are a number of different instrument approaches that can be established, each with specific limitations. As the height of clouds and visibility deteriorate, the necessity for instrument approaches increases. When the cloud ceiling is greater than 1,000 feet above ground level (AGL) and the visibility is greater than three statute miles, the conditions are considered visual and pilots can operate under visual flight rules (VFR). In VFR conditions, no published approaches are required for an aircraft to safely land at an airport. However, once the cloud ceiling is less than 1,000 feet AGL and/or the visibility is less than three statute miles, pilots must operate under instrument flight rules (IFR). Additional air traffic control services are provided to pilots during IFR conditions. During the arrival phase, instrument approaches are what allow a pilot to safely navigate to and land on a runway.

There are three categories for instrument approaches: non-precision approach (NPA), approach procedure with vertical guidance (APV), and precision approach (PA). All provide course guidance to the runway centerline they serve. The degree of horizontal guidance increases with the sophistication of the instrument approach established, which is reflected through the specific minimum operating parameters for each. The primary difference between the three is that non-precision approaches do not provide any vertical guidance to the runway end. For both APV and PA approaches, the vertical course allows an aircraft to descend safely on a fixed glideslope signal, even when the runway environment is not yet in sight.
All instrument approaches have heights published that dictate how low a pilot can descend without the runway environment in sight before having to abandon the approach and try again. For most precision approaches this is called the decision height which is indicated in feet above the ground level. For non-precision approaches, it is referred to as the minimum descent altitude (MDA) and decision altitude (DA) for APV approaches. Both the MDA and DA heights are published in the number of feet above mean sea level. In addition, every instrument approach has minimum visibility requirements, measured in feet or miles, at which an instrument approach can be attempted. For any type of approach, if visual contact cannot be made before the published minimums, then the aircraft must execute a missed approach and either try again or go to an alternate airport.

**APPROACH PROCEDURES WITH VERTICAL GUIDANCE**

Currently, Flagler County has published approach procedures with vertical guidance to Runway 11 and Runway 06. These are area navigation (RNAV) procedures based on Global Positioning Satellites (GPS) and the Wide Area Augmentation System (WAAS) that the FAA certified in 2003. The WAAS receiver sites improved the GPS capability to the point where approach minimums are comparable to the traditional Category I Instrument Landing Systems (ILS) without the need or expense of the airport-specific equipment. More specifically, the improved WAAS performance allowed the FAA to develop LPV approaches, which stands for localizer performance with vertical guidance.

For Runway 11 the LPV approach provides a DA of 320 feet above the threshold elevation with one and a quarter mile visibility for all aircraft types. On the Runway 06 LPV, the approach is published at 250 feet above the threshold elevation with one mile visibility for all aircraft types. Both Runway 11 and Runway 06 also have an additional APV approach published. These are known as LNAV/RNAV which stands for lateral navigation/vertical navigation and have slightly higher DAs and visibility minimums for each approach, respectively.

**NON-PRECISION APPROACH PROCEDURES**

For all four runway ends at Flagler, the RNAV/GPS enables non-precision lateral navigation (LNAV) minimums to be established. On the Runway 11 end, the LNAV approach provides an MDA of 607 feet above the threshold elevation with one mile visibility. On the Runway 29 end, the LNAV approach provides an MDA of 527 feet above the threshold elevation with one mile visibility. On the Runway 06 end, the LNAV approach provides an MDA of 508 feet above the threshold elevation with one mile visibility. And on the Runway 24 end, the LNAV approach provides an MDA of 468 feet above the threshold elevation with one mile visibility. Slightly higher visibility minimums apply to each of these LNAV approaches for the larger and higher performance aircraft.
The RNAV/GPS also provides circling approach minimums which define the MDA and visibility minimums for the different aircraft categories to remain clear of obstacles. The difference is that the circling approach, with its higher minimums, allows an aircraft to approach and establish visual contact with the airport environment in less than visual conditions. Once in the vicinity, the pilot can then maneuver the aircraft to set up a final approach and land on any runway end, unless specific restrictions are published.

At Flagler County there was also a stand-alone circling approach published which is based on the Ormond Beach VHF Omni-Directional Radar Beacon (VOR) and Distance Measuring Equipment (DME). The VOR is a ground-based electronic navigation aid transmitting signals called radials. The DME portion allows pilots to determine their distances to or from the Ormond Beach VOR, which is 10.8 nautical miles to the southeast of the airport. Unfortunately, the VOR circling approach has been unusable for some time due to reception issues. As a result, the FAA announced in April of 2013 that it would officially cancel the VOR approach by the end of the year.

2.02-3 Airfield Lighting

Proper airfield lighting is required at all airports that are utilized for nighttime operations. With the exception of the airport rotating beacon, the lighting systems at the airport are supported by equipment in the airfield electric vault.

IDENTIFICATION LIGHTING

Rotating beacons universally indicate the location and presence of an airport at night or in adverse weather conditions. The rotating beacon is located on top of the airport traffic control tower (ATCT). It is equipped with an optical rotating system that projects two beams of light, one green and one white, 180 degrees apart. The beacon was installed in 2009 and is continuously operated during nighttime hours or when the airfield is under instrument meteorological conditions. The old beacon tower still sits just to the west of the airfield electrical vault.

RUNWAY LIGHTING

Runway lights allow pilots to identify the edges of the runway and assist them in determining the length remaining during periods of darkness or restricted visibility. These lighting systems are classified according to their intensity or brightness. Runway 11-29 and Runway 06-24 are equipped with medium intensity runway lights (MIRL). These systems, as well as the taxiway lights, can typically be activated by pilots through the common traffic advisory frequency (CTAF) on 118.95 MHz when the ATCT is closed.
The MIRLs for both runways consist of base mounted incandescent light fixtures on cans placed 10 feet from the edge of the full strength runway width, within the paved shoulder area. The cables run outside the paved shoulders via trenches that have been cut out to the edge and then patched with asphalt. The cables are then directly buried between each fixture, running along the outside of the runway shoulder pavement.

As part of the runway lighting systems, the identification of the runway ends and thresholds are critical to a pilot during landing and takeoff. Therefore, the runway ends are equipped with special lighting configurations to aid in their identification. Each runway end is identified with four inboard threshold lights on each side. These threshold lights have a two-color (red/green) lens, placed inward from the runway edge. When landing, the green half of the lens faces the approaching aircraft, indicating the beginning of usable runway. The red half of the lens faces the aircraft on takeoff, indicating the end of usable runway.

**TAXIWAY LIGHTING**

All five of the taxiways have medium intensity taxiway lights (MITL) along all or a significant portion of their alignment. Taxiway A does not have MITLs along the portion adjacent to the primary aircraft parking apron. However, on the east end of Taxiway A, the MITLs have been installed using base mounted light fixtures on cans with conduit. The west end of Taxiway A, as well as the other four taxilanes all have stake mounted lights with the cable directly buried in-between each fixture. Each taxiway circuit is made up of traditional incandescent lights and considered to be in poor condition.

**2.02-4 Pavement Markings**

Pavement markings delineate the various movement areas of the airfield. Both runways have landing designator markings, centerline striping, and edge markings, as well as threshold markings and aiming point markers for all four ends. Due to the proximity of the runway intersection to the approach ends of Runway 29 and Runway 24, threshold bars have been added to each of these runway ends to clearly indicate the beginning of usable pavement. All runway markings are painted white and in good condition as they were redone in 2010. There are also shoulder markings along both sides of Runway 06-24. These are painted yellow and somewhat faded as they were not included in the 2010 remarking.

All of the taxiways have centerline stripes with enhanced taxiway centerline markings, prior to the holding position markings, at each intersection with a runway. These markings ensure that taxiing aircraft have the proper wingtip clearance and indicate the areas protected for runway operations. Each of the t-hangar taxilanes and entrances to the aircraft parking areas also have visible centerline stripes. Taxiway edge markings have also been added in a number of locations to delineate the taxiway in areas where there is a large amount of pavement. Examples of this include where
Taxiways C, D, and E traverse the large areas of old abandoned runway pavement. All of the taxiway and holding position markings are painted yellow with a black background and considered to be in very good condition since they were redone in 2010. The t-hangar taxilane markings are considered to be in fair to good condition since they were done at different times.

2.02-5 Airfield Signage

As part of the airfield lighting system, the airport has a number of internally illuminated airfield signs. These include mandatory instruction, location, direction, and destination signs. The mandatory signs include the holding position signs which delineate to a pilot the limits of the runway environment. These critical signs are located on the left side of each connector taxiway, adjacent to the runway holding position markers. The current airfield signage is considered to be in poor condition despite a project in 2010 that installed new panels on all of the sign fixtures.

2.02-6 Takeoff and Landing Aids

There are a number of different takeoff and landing aids at the airport described below. As with the runway and taxiway lighting, any of the takeoff or landing aids that emit light are pilot controlled through the CTAF frequency.

VISUAL GLIDE SLOPE INDICATORS

Visual glide slope indicators are any system installed to provide an indication of the aircraft’s relation to the proper glideslope. At Flagler County, Precision Approach Path Indicator (PAPI) systems have been installed on all four runway ends. These consist of a 2-light unit system for each end, located on the left side of the runway. PAPIs provide the pilot with visual descent information during an approach to a runway. These lights are typically visible from 5 miles during the day and up to 20 miles or more at night. PAPIs use a light bar unit that is installed in a single row perpendicular to the runway edge. The lights project a beam of white light in the upper segment and red light in the lower segment. Depending on the aircraft’s angle in relation to these lights, the pilot will receive a combination that indicates his position relative to the desired glideslope. The PAPIs for Runway 11-29 were installed in 1990 and the ones on Runway 06-24 in 1997. All are considered to be in very poor condition with the units for Runways 29 and 06 placed completely out of service.

WIND INDICATORS

Perhaps the most basic takeoff and landing aid is the windsock, which indicates wind direction and speed. An internally illuminated windsock is located just south of Taxiway A as part of the airport’s segmented circle. The segmented circle helps pilots identify the location of the windsock and is located in the grass area which is
also bordered by Taxiways B, D, and A1. There is also a smaller, unlit supplemental windsock located to the left of the Runway 06 end, between Taxiways C and D. Both windsocks and the segmented circle are considered to be in good condition, as they are constantly maintained by the airport staff.

COMPASS CALIBRATION PAD

There is a compass calibration pad or compass rose located approximately 425 feet south of Runway 11-29 on the abandoned north/south runway. These markings are used to check the variations of an aircraft’s magnetic compass on a regular basis or after repairs or modifications have been made that would affect the aircraft’s compass. The markings are considered to be in fair shape as it was painted in November 2006.

AUTOMATED WEATHER OBSERVING SYSTEM

The airport has an Automated Weather Observing System (AWOS) III P/T located in the middle of the airport, just south of the midpoint for Runway 11-29. The AWOS III P/T is a Vaisala unit which reports the airfield altimeter setting, wind data, temperature, dew point, visibility, and cloud/ceiling data, as well as present weather and lightning detection. Pilots can receive this information in the general aviation terminal, on the assigned radio frequency (128.325 MHz), or through the dedicated telephone number (386) 437-7334. However, during times when the ATCT is operational, the AWOS broadcast is suspended so that the data can be used by the controllers for the Automated Terminal Information System (ATIS) updates, which are broadcast on the same frequency.

2.03 AIRSPACE AND AIR TRAFFIC CONTROL

Controlled airspace is referred to as Class A, B, C, D, or E and uncontrolled airspace as Class G. Generally speaking, Class A airspace begins at 18,000 feet above mean sea level, continues upward, and is used to manage enroute aircraft traffic. Class B airspace surrounds the nation’s busiest airports such as the Orlando and Tampa International Airports. Class C surrounds airports with high traffic levels, but not as high as Class B airports. Both Daytona Beach and the Jacksonville International Airports have Class C airspace. Class D surrounds those airports with an air traffic control tower (ATCT) not located in Class B or C airspace. This includes the Flagler County Airport. Class E airspace is any other controlled airspace where pilots are in radio contact with some portion of the FAA air traffic control network. This network consists of air route traffic control centers, terminal approach control facilities, ATCTs, and flight service stations.

The ATCT at Flagler was commissioned on October 19, 2009. The facility, which is located on the southeast side of the airport, is part of the FAA contract tower program. This program was created to provide lower-cost air traffic control services.
at airports that otherwise would not have received these services, with the primary intent to increase the level of safety. At Flagler, aircraft operations are facilitated by the ATCT services daily from 6:00 a.m. to 8:00 p.m. local standard time.

During the period of time that the ATCT is in operation, all aircraft must establish two-way radio communications with the ATCT before entering the Class D airspace. This Class D airspace has a four nautical mile radius around the airport and extends from the surface up to an elevation of 1,500 feet above the airport elevation. Most of the airport is also surrounded by Class E airspace that begins at an elevation of 700 feet above the surface. This Class E airspace extends out approximately six nautical miles and has no defined vertical limit below Class A airspace. The Class E airspace serves as an extension of the Class D airspace in order to facilitate the various instrument arrival and departure procedures of the airport.

On the south-southeast side of the airport, a portion of the Ormond Beach Municipal Airport Class E airspace (from the surface up) connects with the Flagler Class D airspace. This is to facilitate instrument operations into and out of Runway 17-35 at the Ormond Beach Airport, especially given the fact this airfield lies just beneath the outermost portion of the Daytona Beach International Class C airspace.

During the hours when the Flagler ATCT is closed, the Class D airspace reverts to a Class G (pilot controlled). Pilots use the CTAF (tower frequency) for communication between the aircraft operating to and from the airfield. There are also a number of Military Operations Areas (MOA) and Restricted Areas to the west of the airfield. While none overlap the airport’s airspace, they are only 15 nautical miles away and typically quite active.

2.04 AIRPORT FACILITIES

Nearly every airport facility is located on the north side of the airport, along the Runway 11-29 flightline (see Figure 2-2). Landside access is provided directly off SR 100 via Airport Road or Aviation Drive. Old Moody Boulevard provides access to facilities west of Airport Road. On the south side of the airport, a new road was constructed in 2012 to provide access to the ATCT and open up the Runway 06-24 flightline for development.

2.04-1 General Aviation Terminal

The general aviation terminal sits at the end of Airport Road and is part of 9,600 square foot facility which also includes a clearspan hangar. The general aviation terminal is situated directly across from the corner of the primary aircraft parking apron at the intersection of Taxiways A and D. The clearspan hangar portion of the building takes up 6,400 square feet. Of the remaining 3,200 square feet, approximately 800 square feet is leased office space, leaving 2,400 square feet for the terminal portion.
The terminal consists of a common entrance area to the building that includes public restrooms and a few vending machines in the hallway. The primary open area includes seating areas with tables, pilot/flight planning facilities, and the fixed base operator (FBO) counter area. There are also two offices for the on-site Airport Director and office manager, as well as small storage areas. The County provides a number of the primary FBO services, including all aviation fueling. Other on-airport tenants provide aircraft maintenance (major airframe and major powerplant), aircraft parts, rental cars, charters, flight training, and sight-seeing tours, as well as other services.

2.04-2 Hangars

In addition to the private clearspan hangar that is a part of the general aviation terminal structure, there are a number of hangar facilities, most of which include office space and some retail space.

To the west of the general aviation terminal, there are five rows of t-hangars and four private clearspan hangars. The five t-hangars are situated in the middle of the four clearspan hangars and provide a total of 56 units. Four of the t-hangars have ten units each, while the easternmost has 16. All of these buildings are in good condition, especially the two on the west end, which were constructed in 2012.

The first clearspan hangar west of the terminal (on the opposite side of High Jackers Restaurant) is 6,500 square feet. This facility has a small apron area that ties into the north side of Taxiway A and is considered to be in fair condition. Just north of this hangar and east of the t-hangar rows is a 4,200 square foot clearspan hangar. This private hangar is in good condition and includes an apron area that ties into the easternmost t-hangar taxilane. This is also the hangar described previously with the private heliport markings on the corner of the apron.

To the west of the t-hangar rows and self-service aircraft fuel area, there is a 5,000 square foot hangar. This structure is considered to be in good shape with a small apron off the west end of Taxiway A. Immediately west is the last hangar structure on this side of the airfield. This is a much larger complex with a large aircraft parking apron off Taxiway A. The hangar building provides a total of 39,000 square feet of space for aircraft, offices, and some retail space on the landside of the structure. For aircraft storage, there are six individual bays providing a total of 21,600 square feet of space. The entire facility is considered to be in excellent condition.
NON-AVIATION FACILITIES
1. COMMERCIAL BUILDING (14,500 SF)
2. AIRPORT PROFESSIONAL CENTER (9,000 SF)
3. LIFT STATION
4. FLAGLER COUNTY EMERGENCY SERVICES FIRE STATION 82
5. OFFICE BUILDING (3,000 SF)
6. HICK JACOBS RESTAURANT

AVIATION FACILITIES
A. HANGAR COMPLEX (30,000 SF)
B. CLEARSPAN HANGAR (5,000 SF)
C. SELF-SERVICE FUEL APRON
D. 12,000 GALLON FUEL TANKS (2)
E. 10 UNIT T-HANGAR
F. 10 UNIT T-HANGAR
G. 10 UNIT T-HANGAR
H. 10 UNIT T-HANGAR
I. 10 UNIT T-HANGAR
J. AIRPORT MAINTENANCE (SHED)
K. CLEARSPAN HANGAR (6,000 SF)
L. ELECTRICAL VALLY
M. CLEARSPAN HANGAR (4,200 SF)
N. GENERAL AVIATION TERMINAL
O. CLEARSPAN HANGAR (6,400 SF)
P. CLEARSPAN HANGAR (6,500 SF)
Q. CLEARSPAN HANGAR (14,400 SF)
R. CLEARSPAN HANGAR (4,200 SF)
To the east of the general aviation terminal there are four private clearspan hangar facilities of varying size. The first three are side by side, while the fourth is off the northernmost end of Taxiway E. The closest of the side by side hangars to the terminal is a 6,300 square foot structure. Of this, 4,900 square feet is for aircraft storage and 1,400 for office space. The building is considered to be in good condition and has a small aircraft parking apron off Taxiway A. The next facility provides 10,000 square feet of aircraft storage space and an additional 4,400 square feet of lobby, office, storage, and garage space. There is also a 1,900 square yard concrete aircraft parking apron which ties into Taxiway A, just opposite of Taxiway A1. Constructed in 2006, this facility is considered to be in excellent condition. The last in the group of three hangars is a 4,200 square foot facility that is considered to be in good condition. This hangar only has a small taxilane connecting it to Taxiway A.

The easternmost facility off of Taxiway E provides 19,100 square feet of space (shown on Figure 2-1). Of this, there is approximately 7,000 square feet of aircraft storage space while the rest provides office and storage space, all of which is considered to be in good condition as it was constructed in 2004. The facility also includes an apron area that ties into the northeast end of Taxiway E.

### 2.04-3 Aircraft Parking Aprons

There are three paved aircraft parking areas. The primary aircraft parking apron is located between Taxiway A and Taxiway B, and runs from the general aviation terminal on the east end, to the end of the t-hangars on the west end. This apron provides approximately 17,800 square yards of space; is utilized for both based and itinerant aircraft; and is in excellent condition as it was completely reconstructed in 2012.

The corporate aircraft parking apron was constructed in 2012 to the south of Taxiway A and east of Taxiway A1. This apron provides a total of 6,750 square yards of asphalt; however, only approximately 4,425 square yards are available for aircraft parking due to the setbacks required from Taxiways A and A1. This apron is used primarily by the larger itinerant aircraft.

The east aircraft parking apron is located at the northeast end of Taxiway E (shown on Figure 2-1). This asphalt area provides approximately 5,500 square yards of space and was documented in the 2007 FDOT pavement study in good condition. This rating was expected to stay the same through 2015 and visual inspection conducted in 2012 verified this condition. This apron space is used for overflow aircraft parking and on occasion to temporarily store aircraft for special events.
2.04-4 Aviation Fuel Supply and Service

Immediately west of the t-hangar rows are two above ground aviation fuel storage tanks. Each tank holds 12,000 gallons with one containing 100LL Avgas and the other Jet A. In addition to the double wall construction of the tanks they are also surrounded by a containment area and emergency shut-off valves to avoid spills. Installed in 1990, these tanks are considered to be in good condition and are maintained by the County. They are also located just south of Old Moody Boulevard, which allows tanker truck access for fuel deliveries.

To conduct aircraft fueling operations, the County operates three fuel trucks: one 1,200 gallon for 100LL, one 1,500 gallon for Jet A, and another 3,000 gallon for Jet A. All three trucks are in good condition and maintained as part of the County fleet. Users of 100LL also have the option of pulling directly up to a self-service pump located just off Taxiway A and south of the storage tanks. The pump and credit card machine are located on an island in the middle of a 1,650 square yard concrete apron. This provides enough space for most aircraft using 100LL to taxi on either side of the pump. The self-service apron and truck access road are constructed of concrete and in good condition.

2.04-5 Support and Service Facilities

Airport support and service facilities include the airport’s electrical vault, fire and rescue services, and maintenance equipment.

ELECTRICAL VAULT

The airport has an airfield electrical vault that distributes power to the airfield lighting circuits. The vault, which measures 13 feet by 9 feet, is located to the west of High Jackers Restaurant and north of the clearspan hangar just off Taxiway A. Despite the small size, the vault houses all of the airfield lighting regulators, meters, main disconnect, breaker panels, an airfield lighting control panel, and the radio control panel to facilitate pilot control of the airfield lighting. Power to the electrical vault is via a drop from the overhead service that comes from the corner of the restaurant parking lot.

FIRE AND RESCUE SERVICES

Currently the Flagler County Emergency Services provides the fire and rescue services for the airport. Fire Station 92 is located on airport property at the corner of Airport Road and Old Moody Boulevard. While the station is operated 24 hours a day, seven days a week, the facility does not currently have any specific aircraft rescue or firefighting equipment such as foam or dry chemicals. Emergency Services
also bases their Fire Flight helicopter at the airport, which is primarily used to fight area wildfires, but also conducts air ambulance and surveillance missions.

**AIRPORT MAINTENANCE EQUIPMENT**

The airport has a number of both small and large pieces of equipment to maintain various facilities on the airport. These vary from simple hand tools to the larger mowing equipment. All of the smaller tools and equipment are stored in a 20 foot by 30 foot metal shed near the electrical vault. The structure, which is in good condition, also contains many of the spare parts for the various airfield lighting and other facilities on the airport. Most of the larger items have to be stored outside.

**2.04-6 Airport Infrastructure**

Electric power, water supply, and wastewater service are required for both aviation and non-aviation facilities at the airport. This section provides a general description on the types of utilities available at the airport and their providers.

Florida Power and Light provides all electric service to the airport. On the northeast side of the airfield, all electric power is provided by the overhead distribution lines that run south along Aviation Drive from the main transmission lines along SR100. These overhead distribution lines go underground behind the easternmost hangar off Taxiway A. From this point they follow Aviation Drive underground to the hangar facility at the north end of Taxiway E. In 2009 this underground power was extended southeast in front of the approach ends of Runway 24 and 29 and then south to the ATCT. For the northwest side, another set of overhead distribution lines run south from SR 100 to Old Moody Boulevard just to the west side of the Flagler County Chamber of Commerce complex. These overhead lines then continue west along Old Moody Boulevard where they terminate at the Triangle Air Business Park.

While water service is provided by the Flagler County Utilities Division, the County does not produce potable water. Water is purchased from the City of Palm Coast. All of the existing parcels, including those that are undeveloped, have reasonable access to existing water lines. There are also fire hydrants located along all of the roads on airport property, including the new south access road. The County makes all repairs to the water lines within their unincorporated areas, including the airport.

Wastewater services for the airport are also ultimately provided by the City of Palm Coast as the County only operates a small wastewater treatment plant. However, the County does maintain and makes any necessary repairs to the lines and equipment that are within the unincorporated portions of the County. This includes the lift station that is located in the open area south of SR 100 and between Airport Road and Aviation Drive. At this time all undeveloped areas have reasonable access to the existing wastewater service and the only septic tank system is the one that was originally installed for the ATCT in 2009.
2.04-7 Non-Aviation Facilities

There are a couple of non-aviation facilities located on airport property. The first is High Jackers Restaurant which is located immediately west of the general aviation terminal. North of the terminal there is a 3,000 square foot office building. As mentioned previously, Flagler County's Emergency Services Station 92 is located at the airport on the corner of Airport Road and Old Moody Boulevard. Just across from the station is the Airport Professional Center. This three story office building provides a total of 9,000 square feet of space. At the western end of Old Moody Boulevard is the Triangle Air Business Park. A portion of the non-aviation leases in this area are on the landside of the large hangar complex described previously. However, there is also an additional 14,500 square foot building with no airside access. This facility includes a paved 2,000 square yard lot for a motor fleet (in addition to the regular vehicle parking). There is also an on-airport cell tower located on the east side of the airport, just south of the airport property line. This facility was closely coordinated with the FAA to ensure that it did not impact any of the airspace associated with the runway system, approaches, or flight patterns.

2.05 HISTORIC AVIATION ACTIVITY

The historic number of based aircraft and annual operations is essential to the development of forecasts for future aviation activity. Annual fuel sales have also been included as an indicator of activity at the airfield prior to the commissioning of the ATCT in 2009. This information will be analyzed in the following chapter against industry trends and other activity indicators, as well as past projections in order to develop activity forecasts. Different sources were utilized to compile the historic data shown in Table 2-2.

2.05-1 Based Aircraft

Based aircraft are those aircraft that have a lease for storage facilities on the airfield or use the airport for a majority of the year. As discussed in the forecasts, this number can vary significantly as airport records include the regular seasonal users while the FAA database typically does not. The historic number of based aircraft was obtained from the Florida Aviation Database and airport records.

2.05-2 Annual Operations

An aircraft operation is counted as either one landing or one takeoff. Further, a touch and go operation is counted as two operations, since the aircraft technically lands and immediately takes off. The primary source of annual operations data for airports with an ATCT is the FAA Air Traffic Activity Data System (ATADS). However, since the ATCT at Flagler did not open until October 19, 2009, another source for the prior years was needed. Annual operations for 2009 and before were obtained from the Florida Aviation Database. It should be noted that the ATADS data only reflects the
official counts by the ATCT (14 hours per day) whereas those from the Florida Aviation Database are estimates based on a 24 hour day.

2.05-3 Fuel Sales

Historic fuel sales have also been included in Table 2-2 to help illustrate the level of activity that was occurring at the airport before the ATCT. These figures will be taken into consideration as part of the projection of future activity.

<table>
<thead>
<tr>
<th>Year</th>
<th>Based Aircraft</th>
<th>Annual Operations</th>
<th>Fuel Sales (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>58</td>
<td>190,010</td>
<td>163,000</td>
</tr>
<tr>
<td>2004</td>
<td>65</td>
<td>190,010</td>
<td>238,000</td>
</tr>
<tr>
<td>2005</td>
<td>65</td>
<td>227,661</td>
<td>390,000</td>
</tr>
<tr>
<td>2006</td>
<td>83</td>
<td>195,710</td>
<td>500,000</td>
</tr>
<tr>
<td>2007</td>
<td>86</td>
<td>202,460</td>
<td>600,000</td>
</tr>
<tr>
<td>2008</td>
<td>82</td>
<td>202,460</td>
<td>417,000</td>
</tr>
<tr>
<td>2009</td>
<td>53</td>
<td>190,010</td>
<td>243,000</td>
</tr>
<tr>
<td>2010</td>
<td>59</td>
<td>171,766*</td>
<td>153,000</td>
</tr>
<tr>
<td>2011</td>
<td>61</td>
<td>176,309*</td>
<td>219,000</td>
</tr>
<tr>
<td>2012</td>
<td>64</td>
<td>153,585*</td>
<td>198,000</td>
</tr>
</tbody>
</table>

Source: Florida Aviation Database, airport records, and FAA Air Traffic Activity Data System.

*Actual ATCT count

2.06 CONCLUSION

The above descriptions do not provide an exhaustive account for every specific detail and facet of the Flagler County Airport. The purpose of this inventory was to provide general facility data for subsequent analyses. These facilities will be evaluated in conjunction with forecast demand and established planning criteria, to determine future needs for the airport.
CHAPTER 3 - FORECASTS OF AVIATION DEMAND

This chapter presents projections of aviation activity that will be used as the basis for facility planning at the Flagler County Airport. The objective of forecasting is to estimate future levels of airport activity from which the demand for facilities can be derived. By comparing this demand with existing facilities, it is possible to identify any deficiencies. Thus, the forecasts serve as the basis for future steps, such as the facilities requirements, in the planning process.

3.01 CONSIDERATIONS FOR PROJECTING DEMAND

A key focus is to analyze how recent and ongoing aviation industry trends are expected to impact the future demand for airport facilities. Nationally, activity conducted by general aviation aircraft has had an overall decline for more than a decade. In fact, total operations in the nation have not achieved the levels that existed prior to the September 2011 terrorist attacks. However, as described in later sections, Florida has not suffered as much as the rest of the nation. This coupled with the current economic and population growth expected in Flagler County supports an optimistic outlook for future demand.

The standard planning period for an airport master plan is 20 years. Since this study was primarily conducted in 2013, forecasts are presented for 2018, 2023, and 2033 as the key planning periods are generally considered at the five, ten, and 20-year horizons. The forecasts primarily use data obtained through 2012, although changes to the number of based aircraft in January 2013 were also considered. The development of the forecasts incorporate analyses of historic data, industry trends, projections by the Federal Aviation Administration (FAA), and the Florida Department of Transportation (FDOT), as well as other activity indicators. In order to develop a more complete picture of operational activities and emerging trends at Flagler County, information was also obtained through interviews with airport management, management of the FAA contract tower, the Airport Advisory Board, tenants, and significant users of the airport.

3.01-1 Elasticity of General Aviation Industry

General aviation encompasses all segments of the aviation industry except for the activity that is conducted by scheduled airlines or the military. Examples include pilot training, law enforcement flights, medical transportation, aerial surveys, aerial photography, agricultural spraying, advertising, and various forms of recreation, not to mention business, corporate, and personal travel. As history shows, general aviation is an industry that has struggled through some very significant impacts, both positive and negative.
While the 2005 Airport Master Plan Update was being conducted, general aviation was starting to emerge from the impacts of September 11th. Between 2003 and 2007, the industry also experienced major advances in aircraft and navigation technologies, which created new product offerings and services during a period with an overall good economy. These included widespread use of Global Positioning Satellites (GPS) applications in the cockpit, for airport navigational aids, and instrument approaches. This period also resulted in the emergence of very light jet aircraft and the introduction of an entirely new category; the light sport aircraft. These new product offerings and services bolstered most every segment of the general aviation industry. Unfortunately, there was still little to no growth in the total activity generated during this period.

By the end of 2008, most segments of the industry experienced losses as the overall national economy declined into the Great Recession. The very light jet industry was hit hardest as nearly every manufacturer went bankrupt. Even though the industry continued to struggle through 2012, a number of positive signs are on the horizon, including re-emergence of a number of very light jet manufacturers and growth in the light sport aircraft segment. Even business jet activity has been positive after losing 20 percent of total activity as a result of the negative press during the 2008-09 corporate bailouts. Since, many companies have started to use general aviation as an essential part of their businesses again. Once again there is growth and many industry indicators, including the FAA’s Aerospace Forecasts, project business jet activity to lead a recovery. In fact, for the first time since 2007, the General Aviation Manufacturer’s Association (GAMA) reported an increase in new general aviation shipments for 2011. This trend is expected to continue as the numbers delivered through the third quarter of 2012 were up 18.1 percent over the same 2011 figures. These and other industry indicators are addressed further in the relevant sections of this chapter.

3.01-2 Recent Projections of Aircraft and Activity

The three most recent local, statewide, and national forecasts for the airport include the 2005 Airport Master Plan Update, the Florida Aviation System Plan 2025 (FASP), and the 2012 FAA Terminal Area Forecast (TAF). The projections of based aircraft and annual operations from each are summarized in the sections that follow. As required for FAA acceptance, a direct comparison of the recommended forecasts must be made with the FAA TAF. This comparison is included at the end of the chapter.

2005 AIRPORT MASTER PLAN UPDATE

The last planning document conducted specifically for Flagler County was the 2005 Airport Master Plan Update. As with this study, the previous master plan included forecasts which were projected for a 20-year planning period. The numbers of based aircraft and total annual operations projected have been extrapolated out to 2033 to provide a basis of comparison with the forecasts generated in this study.
As shown above, based aircraft were projected to increase at an average annual growth rate of 4.2 percent and annual operations at 2.9 percent between 2003 and 2022.

**FLORIDA AVIATION SYSTEM PLAN**

The Florida Aviation System Plan (FASP) helps guide the development of Florida’s public airports. This plan is necessary to ensure that airports work together effectively as a statewide transportation system, provide a link to the global air transportation network, and effectively interface with regional surface transportation. As such, the Aviation Office of FDOT updates these activity forecasts annually for all publicly-owned, public-use airports in the state. This is typically done around the end of October. The 2012 FASP projects aviation activity through 2031, using 2011 as the base year. These figures have also been extrapolated to 2033 for comparison purposes.
Overall, the 2012 FASP projects an average annual growth rate of 3.5 percent for based aircraft and 1.2 percent for annual operations.

**FAA TERMINAL AREA FORECAST**

The Terminal Area Forecast (TAF) is prepared annually by the FAA as the official forecasts of aviation activity for their facilities. They are generated to meet the budget and planning needs of the agency, as well as to provide information for use by state and local authorities, the aviation industry, and the public. Projections in the FAA TAF are calculated utilizing a number of methods for each airport in the National Plan of Integrated Airport System (NPIAS). Since 2006 the historic based aircraft in the TAF reflects those validated by airports participating in the FAA National Based Aircraft Inventory Program. For airports with an airport traffic control tower, the annual operations are from the FAA Air Traffic Activity Data System (ATADS) with totals shown for the FAA fiscal year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Based Aircraft</th>
<th>Annual Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>52</td>
<td>181,336</td>
</tr>
<tr>
<td>Forecast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>59</td>
<td>168,035</td>
</tr>
<tr>
<td>2023</td>
<td>64</td>
<td>175,945</td>
</tr>
<tr>
<td>2033</td>
<td>74</td>
<td>192,923</td>
</tr>
</tbody>
</table>

Source: 2012 FAA Terminal Area Forecast.

The 2012 FAA TAF projects an average annual growth rate of 1.6 percent for based aircraft and 0.3 percent for annual operations.

### 3.01-3 Current Industry Indicators

While the number of based aircraft and annual operations are the primary gauge for demand at a general aviation airport, these must be analyzed further to provide useful information for facility planning. The individual sections of this chapter provide detail on the methodology behind the various forecasts, with each relying on both common and specific industry expectations. The most comprehensive and consistent source for evaluating the general aviation industry is the FAA Aerospace Forecasts. Each year the FAA Aerospace Forecasts are published with updates to their projections of key aviation and aerospace statistics.

Overall the 2012 FAA Aerospace Forecasts project positive growth over the next 20 years, despite the industry fluctuations that are likely to continue. According to the 2012 FAA Aerospace Forecasts, the overall number of active general aviation aircraft
is expected to increase 0.6 percent annually through 2032. The FAA predicts that business and corporate traffic will outpace private or recreational use. In fact, the 2012 Aerospace Forecasts project that the more expensive and more sophisticated turbine-powered portion of the active fleet will grow at 2.9 percent annually through 2032. This group includes rotorcraft, but if just the turbine jet aircraft are considered, the rate increases to 4.0 percent annually.

Equally encouraging is that the number of hours flown by all general aviation aircraft is projected to increase 1.7 percent annually through 2032. Within this growth, the turbine fleet is expected to grow 3.6 percent annually. As shown in the FAA’s monthly Business Jet Reports, since the low in 2009, operations conducted by general aviation turbine aircraft have consistently increased through the end of 2012. They are however, still below the level prior to the 2008-09 corporate bailouts.

3.02 FORECAST OF BASED AIRCRAFT

The number of aircraft owners projected to use Flagler County as their base is an important consideration when planning facilities. The based aircraft forecast will directly influence the type and number of aircraft storage facilities and apron space needed. Projections of based aircraft also provide one indication of the anticipated growth in flight activity that is expected to occur at the airport.

3.02-1 Current Aircraft Based at Flagler

Table 2-2 documented that in 2012 there were 64 aircraft based at Flagler. This is according to the detailed records at the airport which were also uploaded to the FAA’s National Based Aircraft Inventory Program. The FAA program first determines if all of the aircraft reported have a current registration, then a check is made to see if any of the aircraft have been reported by another airport. This creates a validated number of based aircraft for a given airport. In Flagler’s case, all aircraft submitted were found in the aircraft registration database, but eight were not validated as they were also reported by other airports.

For airport master planning, this illustrates an issue with the FAA National Based Aircraft Inventory Program. While it may take time for some aircraft to be purged from their previous home base airport, there are a number of aircraft that are simply seasonal, as is the case with the eight for Flagler. However, with respect to facility planning, these seasonal aircraft, especially those that lease airport facilities, must be considered. Of the eight based aircraft not validated by the FAA, airport records show that six have been regular tenants for at least 2 to 4 years. The other two are managed by a company with facilities at Flagler and frequently operate from the airport throughout the year. The FAA admits this problem and states in the documentation for the National Based Aircraft Inventory Program:
“At this time, the requirement that an aircraft can only be counted for a single airport is believed to provide data integrity benefits that outweigh the disadvantage to some facilities, but this subject continues to be under review and it may be changed in the future.”

The National Based Aircraft Inventory Program also does not count glider, ultralight, or military aircraft since these may not always have a tail number for registration. In the past there have been ultralights based at Flagler that were also excluded from the validated list. For these reasons, the forecast of based aircraft will utilize the detailed airport records that have been kept since 2008. For prior years (2003 – 2007) the data has been obtained from the Florida Aviation Database, which comes from the annual airport inspections conducted by FDOT Aviation and Spaceports Office staff.

As mentioned previously, data from January 2013 will be used as the base year of all based aircraft projections, since this number increased significantly at the end of 2012 when 20 new t-hangar units were constructed. While some of the t-hangars were filled by existing tenants (either from the apron or other hangars) the detailed counts at the end of January 2013 totaled 79 based aircraft. As a side note, it is fully anticipated that more than eight aircraft will not be validated in the FAA system for 2013 since it is likely that a number of the new tenants will still be on the lists of those airports they have just transferred from.

### 3.02-2 Historic Growth

Because the general aviation industry is cyclical in nature, it is important to analyze the overall changes that have occurred at the airport. Despite the challenges the industry has faced over the last decade, there has been an increase in the number of based aircraft from 2003 to 2013. The average annual growth for this period was used to create one forecast scenario. When applied to the current level of based aircraft, the historic average annual growth of 3.1 percent results in a projection of 147 based aircraft by 2033.

### 3.02-3 Previous Growth Projections

As shown in Table 3-1, based aircraft projections from the previous master plan had higher figures for both 2007 and 2012 than the count of 79 aircraft at Flagler in January 2013. This is interesting as the forecast was based on the County’s expected increases in population through 2015, which to date have been significantly below (20 to 25 percent) what has actually occurred in the County’s growth. Therefore, the previous master plan projection was not considered further.

Conversely, since the statewide plan for Florida is updated each year, it benefits from being able to adjust annually to changes in the industry that ultimately affect the level of based aircraft. As a result, projections from the 2012 FASP, which use 2011 as the base year, are only two aircraft off from the 79 aircraft documented in January 2013.
Therefore, the projected growth of based aircraft from the 2012 FASP has been updated with the current number of based aircraft to provide an updated forecast for consideration.

Projections from the 2012 TAF are based on those aircraft validated for Flagler by the National Based Aircraft Inventory Program. As described previously, this does not accurately represent the number of aircraft actually leasing and using airport facilities. However, the projected growth rate is worth considering since it is derived by the FAA as part of their annual projections based on various indices and expectations in the industry. Applying the FAA growth results in 109 based aircraft by 2033.

3.02-4 National Active Fleet Forecasts

Each year the FAA provides a long term projection for the active general aviation fleet, with active being defined as any aircraft flying at least one hour during the year. Despite decreases in the total active fleet since 2007, the FAA reversed this trend in 2011 and projected positive growth through 2032. This projection is considered very realistic as new shipments of general aviation aircraft in the U.S. have increased. As noted before, actual deliveries posted through the 3rd quarter of 2012 are up 18.1 percent over shipments during the same period in 2011. A projection based on the FAA’s expectations for the national active fleet result in a forecast of 89 based aircraft at Flagler by 2033.

3.02-5 Regression Analysis

Both linear and multiple regression models were created to evaluate and project the number of based aircraft. These utilized individual and combined sets of socioeconomic data for the County under the assumption that the tendency for people to use general aviation can be related to variables such as an area’s population or income. Specifically, population and the number of households were included based on the assumption that the number of based aircraft is inherently related to the number of people in the area served by the airport. Income data was utilized because the use of general aviation has a median level of expense. In other words, it is believed that more people tend to use general aviation as their income level increases.

All of the models resulted in low statistical correlation values and only a few actually predicted growth through 2033. In the best scenario, this growth was only for an additional six based aircraft over the planning period. Most of the models were relatively flat and some even negative. These limited relationships are attributed to the fact that all of the socioeconomic variables used experienced consistent growth between 2003 and 2011. Therefore, it is very difficult for these as independent variables to explain the variations in the historic level of based aircraft. None of the regression models were considered to be realistic forecasts.
3.02-6 Selected Based Aircraft Forecast

Over the past ten years, the Flagler County Airport has been supported by the County Commission, FDOT, and FAA considerably. This is an important observation to make as it has had a direct impact on the ability for the airport to improve the facilities and services offered by the airport. The result has been steady growth which most recently has been highlighted by the new t-hangars and apron area improvements described previously. These are important to consider when evaluating the various projections shown in Table 3-4.

<table>
<thead>
<tr>
<th></th>
<th>Historic Growth</th>
<th>Statewide System Plan</th>
<th>Growth from TAF</th>
<th>National Active Fleet</th>
<th>Selected Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
</tr>
<tr>
<td>Forecast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>92</td>
<td>94</td>
<td>86</td>
<td>81</td>
<td>93</td>
</tr>
<tr>
<td>2023</td>
<td>108</td>
<td>111</td>
<td>93</td>
<td>84</td>
<td>109</td>
</tr>
<tr>
<td>2033</td>
<td>147</td>
<td>157</td>
<td>109</td>
<td></td>
<td>151</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

This is not to say the airport has been insulated from the various ups and downs of the general aviation industry or economy for that matter. In fact, as the historic figures show in Table 2-2, the airport experienced a peak of 86 based aircraft in 2007, which was followed quickly by a drop to 53 in 2009. While some of the decreases are likely the result of the overall decline of the national economy during the same period, there were also two significant events that explain the increase and then drop through 2007. These are the opening and closing of both the Ginn Development Company’s operation and Commercial Airline Pilot Training (CAPT) facility at the airport.

While the growth projected in the FAA TAF and nation’s active fleet are reasonable forecasts for their purposes, they cannot take into consideration the local issues described above. The application of the TAF average annual growth rate results in 30 new aircraft by the end of the planning period. Considering the actual growth that has occurred, this scenario is considered low. Similarly, applying the anticipated national growth to the current based aircraft count provides an even more conservative projection. This projection is not realistic since it is highly likely that the airport will accommodate more than another 10 aircraft over the next 20 years.

For a number of years Flagler County has maintained a hangar waiting list. When the airport started the process of assigning leases for the 20 new t-hangar units in the later part of 2012, there were 65 people on the waiting list. After the various transfers of existing versus new tenants were conducted to fill the new t-hangars, 37 people
remained on the waiting list. This illustrates that there is still a strong demand for facilities at the airport. Even if the typical rule of thumb were applied that up to 50 percent of the individuals on the current waiting list would not lease a facility if offered, that would still indicated 18 more hangar spaces could be filled, many of them likely to be new tenants to the airport.

The historic growth projection incorporates these and other local tendencies. However, it may not fully account for the significance of aviation in Florida, including the impact of the surrounding region. As described previously, the East Central Florida region is the second most populated of the nine regions used for the state’s public-use airports. Therefore, an average of the historic growth and that projected by the statewide system plan was adopted. This is intended to balance what can reasonably be expected by the local airport circumstances while at the same time providing an element for the regional significance. The resultant growth rate, 3.3 percent annually, is considered realistic for the planning periods and this average was selected for the based aircraft forecast of this study.

3.03 FORECAST OF BASED AIRCRAFT FLEET MIX

Projecting the types of based aircraft is necessary since different aircraft require different facilities. Overall, the future based aircraft fleet mix was determined by studying the projections of the national fleet, then comparing to the current types at Flagler. While the overall growth in the nation’s active fleet was not utilized to forecast based aircraft, the individual projections of aircraft types are very useful in predicting the future based aircraft fleet mix.

3.03-1 The Nation’s Active General Aviation Fleet

Every year, the nation’s active general aviation fleet is published as part of the FAA Aerospace Forecasts. In 2011 there were 222,520 active general aviation aircraft. This figure is down from those posted since 2005. However, by 2032, the FAA predicts this figure to increase to 253,205 aircraft. While the FAA provides counts for a number of aircraft categories, they have been simplified into the five shown in Table 3-5. Within the single-engine grouping is the single-engine piston, experimental and light sport aircraft categories. The multi-engine group contains both piston and turboprop models as the rotorcraft group contains both piston and turbine models. The jet category covers all ranges of turbojet general aviation aircraft, from the very light jets to the heaviest business jets.

The FAA projects a noticeable growth in the jet category. Several reasons exist to support this anticipated growth. While the use of business aircraft fell after 2007, jet aircraft use by smaller companies is expected to recover and increase as various charter, lease, time-share, partnership, and fractional ownership agreements provide different options for these aircraft to obtain higher utilization rates. Businesses rely on general aviation transport because it provides safe, efficient, flexible, and reliable
Fractional ownership offers consumers a more efficient use of time by providing faster point-to-point travel times and the ability to conduct business while flying, as well as minimum enplaning and deplaning hassles.

### TABLE 3-5
**FORECAST OF NATION’S ACTIVE FLEET**

<table>
<thead>
<tr>
<th></th>
<th>2011 Fleet Mix</th>
<th>2032 Fleet Mix</th>
<th>Average Annual Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine</td>
<td>76.1 %</td>
<td>69.8 %</td>
<td>0.2 %</td>
</tr>
<tr>
<td>Multi-Engine (piston &amp; turboprop)</td>
<td>11.3 %</td>
<td>10.2 %</td>
<td>0.1 %</td>
</tr>
<tr>
<td>Jet</td>
<td>5.3 %</td>
<td>10.6 %</td>
<td>4.0 %</td>
</tr>
<tr>
<td>Rotorcraft</td>
<td>4.7 %</td>
<td>7.2 %</td>
<td>2.7 %</td>
</tr>
<tr>
<td>Other (gliders, balloons, etc.)</td>
<td>2.6 %</td>
<td>2.2 %</td>
<td>-0.1%</td>
</tr>
</tbody>
</table>

Source: 2012 FAA Aerospace Forecasts.

The continuing popularity of travel by general aviation aircraft is also due to the ability to use smaller, less-congested airports located closer to the final destination. A large part of this is due to the expanded application of GPS technologies in navigation, but more specifically the myriad of new runway specific instrument approach procedures that have been established at even the smallest airports. In the FAA’s projections, jet aircraft models including the very light jets are expected to replace a number of the piston aircraft in the future, especially those typically in the multi-engine group. Hence the reason the multi-engine group shows virtually no growth while the jets are expected to represent nearly 11 percent of the active general aviation fleet by 2032.

Finally, while growth is shown in the single-engine category, the projection for traditional single-engine piston is an average annual decrease of 0.1 percent. The growth in this general grouping is from the expected increases in both experimental and light sport aircraft. The popularity of these aircraft is important to consider given current fuel prices and the desirable flying conditions in Florida for such aircraft.

### 3.03-2 Flagler County Airport Based Aircraft Fleet Mix

The current based aircraft at Flagler County is 73.4 percent single-engine, 16.5 percent multi-engine, 2.5 percent jet, and 7.6 percent rotorcraft. Throughout the planning period, the mix of aircraft is expected to remain predominately single-engine (including a few experimental and light sport aircraft). The more significant changes are the number of jet and rotorcraft expected to be based at the airport. This is reasonable considering that the FAA has predicted that turbojet technology is at the point where it is truly feasible as a replacement to the more traditional piston fleet. Likewise, due to its flexibility, utilization, and popularity, additional rotorcraft are expected.
TABLE 3-6
FORECAST OF BASED AIRCRAFT FLEET MIX

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2018</th>
<th>2023</th>
<th>2033</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine</td>
<td>58</td>
<td>66</td>
<td>71</td>
<td>92</td>
</tr>
<tr>
<td>Multi-Engine</td>
<td>13</td>
<td>14</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>(piston &amp; turboprop)</td>
<td>2</td>
<td>5</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Jet</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Rotorcraft</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other (gliders, balloons, etc.)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>79</td>
<td>93</td>
<td>109</td>
<td>151</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

As with most airports, the single and multi-engine categories are predominantly comprised of Beech, Cessna, Mooney, and Piper models. Likewise, the multi-engine aircraft tend to include the Beech King Air Series; Cessna models, such as the 414 Chancellor; or Piper Seneca aircraft. As indicated before, the national fleet of single- and multi-engine is anticipated to only grow slightly in the future. Thus, by the end of the planning period, the share of single and multi-engine aircraft is expected to decrease, although the actual number of these aircraft increases. While the additional single-engine are expected to be similar to those currently at the airport, those in the multi-engine category are expected to be turboprop.

Based jets will continue to include the small to medium sized business jet aircraft with popular models from the Bombardier Learjet, Cessna Citation, and Dassault Falcon series. Larger jet aircraft are also expected by the middle of the planning period to include models from the Beechcraft Hawker, Bombardier Challenger, Dassault Falcon, and Gulfstream series. Rotorcraft will continue to include both piston and turbine powered models, such as the popular Bell, Eurocopter, and Robinson models.

3.04 FORECAST OF ANNUAL AIRCRAFT OPERATIONS

Annual aircraft operations are the primary measure by which airport facilities are evaluated. The level and type of activity is translated into the standards and facilities needed to safely accommodate the operations. The FAA defines an airport operation as either a single aircraft landing or takeoff. Operations are also divided into the categories of local or itinerant. Local operations are those arrivals or departures performed by aircraft that remain in the airport traffic pattern or are within sight of the airport. Local operations are most often associated with training activity and flight instruction. Itinerant operations are arrivals or departures other than local operations, performed by either based or transient aircraft.

As discussed in some of the following sections, flight training activities make up the majority of the local operations at Flagler. This is in part due to the fact that under
the FAA definitions, touch and go training procedures are considered two local operations (one arrival and one departure). Itinerant general aviation operations are typically comprised of private, business/corporate, and air charter transportation flights. Details on the split between these types of operations are included in a subsequent section.

3.04-1 Historic Growth

As with based aircraft, historic data should be considered when analyzing the potential growth in aviation activity for an airport. Unfortunately, since the ATCT has only been in operation since October 2009, the counts prior are estimates. Also, the estimates of activity are based on a full day versus the ATCT counts, which are only for the 14 hours when the tower is open. Therefore, the estimates prior to the opening of the ATCT are higher than the numbers recorded over the past three years. Consequently, a negative trend line results for any historic data set that is analyzed, so this method was not considered to create a projection for future operations.

It should be noted that the estimates from the Florida Aviation Database were selected for the years 2003 to 2009 in order to present some representation of the activity. For non-towered airports (as Flagler was during that period) the state data is based on observations from the annual inspection, input from airport management, and to a certain extent, the level of based aircraft. While the historic data from 2003 to 2009 cannot be used to estimate future activity, it does illustrate an increase and then subsequent decrease that likely represents the Ginn Development Company and CAPT facility operations at that time.

3.04-2 Previous Growth Projections

Annual operations in the 2005 Airport Master Plan Update were projected to have an average growth rate of 2.9 percent over the 20-year planning period. This resulted in a very high forecast since the 2003 base year was estimated at 215,328 annual operations. However, this rate of growth was applied to the current ATCT counts for consideration.

Projections of the annual operations in 2012 FASP benefit from being updated on an annual basis. Not only does this help temper industry fluctuations, it also allows adjustments to be made for the individual airports to accommodate any local or regional changes. The activity projection from the 2012 FASP was updated with the most recent ATCT counts for use in this analysis.

The aircraft operations data used in the 2012 TAF is not considered reliable enough to generate a new forecast. While the base year figure for 2011 is the actual fiscal year count from ATADS, it is not understood why the first forecast year of 159,696 for 2012 is from the actual fiscal year count for 2012. Undoubtedly 2012 was a year of significant declines at most every airport in the nation; however, the TAF suggests
that Flagler will not regain the level of operations recorded in 2011 until sometime after 2026. Perhaps this is partly due to the fact that the lowest historic figure, which is shown for fiscal year 2010, does not represent a full year of data. Rather, this is the actual count from the ATCT for the first year of operation, which did not include October 2009 since it was not a full month. Therefore, the relatively flat TAF projection of less than one percent of growth each year was not evaluated any further.

3.04-3 Utilization of the General Aviation Fleet

Each year as part of the Aerospace Forecasts, the FAA provides historic data and projections on the number of hours flown by general aviation aircraft. In the 2012 Aerospace Forecasts, the FAA anticipates the utilization of the fleet to increase at an average annual rate of 1.7 percent between 2011 and 2032. There are two significant assumptions by the FAA for this growth that directly relate to Flagler. The first is their belief that as the total number of single-engine piston in the active fleet declines, utilization of those in the fleet will increase. The second is that turbine fleet (including rotorcraft), which already tend to have a high utilization rate, are expected to lead the growth in the overall fleet for the next twenty years.

These reasons relate directly to the flight training, business/corporate activity, and rotorcraft operations conducted at Flagler. Therefore, the FAA’s positive outlook on the hours flown have been applied to the aircraft operations for Flagler to create a new forecast scenario. This results in 218,821 annual operations by the end of the planning period.

3.04-4 Projection by Type of Operation

Historic fuel sales for the airport were included in Table 2-2 to help indicate the level of activity that was occurring at Flagler before the ATCT was commissioned. These values come directly from airport records and reflect the increase and decrease that can be directly related to the Ginn Development Company and CAPT facility operations. It therefore stands to reason that a correlation between fuel sales and operations can be made. The only problem with this assumption is that a significant amount of the current activity is conducted by flight schools that are not located at Flagler and do not buy any fuel. Therefore, the activity generated by these were evaluated and projected differently.

Unfortunately there are no actual counts made for operations conducted for flight training. Interviews were conducted with airport and ATCT management, as well as representatives of Embry-Riddle Aeronautical University (ERAU) and Phoenix East Aviation, Inc. to better define the level of flight training. When all of the information was considered, it was estimated that 70 percent of the flights were related to flight training. The remaining 30 percent is therefore assumed to include all other operations such itinerant operations and/or those conducted by local tenants. This
assumption fits within the local and itinerant counts which have been documented by the tower in 2012 as 72.5 and 27.5 percent respectively.

During discussions with the flight schools, information related to their historic and future enrollments were revealed. Very specific data was provided by ERAU on the number of flights actually completed (not just scheduled) each day. This data documents the university’s consistent growth and was utilized to project flight activity at the airport. The combined result of this and the projection for the other aircraft activity results in 244,763 operations by the end of the planning period.

### 3.04-5 Market Share

A common methodology for forecasting aviation activity is the use of market share analysis. This approach evaluates the extent to which Flagler captures a portion of a defined market, whether local, regional or national. Total operations from the Florida Aviation Database were not utilized since these figures merely represent a total of the individual airport forecasts (bottom up approach). However, projections of the total activity for all of the nation’s airports with an ATCT (either FAA or FAA contract tower) were utilized to create a market share analysis.

In the 2012 Aerospace Forecasts, the FAA projects the total operations for all of the towered airports in U.S. This forecast also includes a breakout of the expected level of general aviation operations for the nation. However, the counts for total activity were preferred since the airport also accommodates air taxi and military operations. Calculations of the actual operations at Flagler against those for the nation were used to estimate the future share that could be expected based on the FAA’s national forecast. This results in 219,326 annual operations accommodated by Flagler in 2033.

### 3.04-6 Omitted Forecast Methodologies

Both regression analysis and forecasting operations using based aircraft were omitted from this analysis for similar reasons. A majority of the aircraft activity conducted is either flight training or itinerant operations. None of the socioeconomic data available was considered applicable in being able to create a regression model that could reasonably explain the historic variations in aircraft activity. As for projecting operations using the forecast of based aircraft, this too did not seem sensible given the fact that so many operations are conducted by aircraft other than those based at Flagler. Typically this method is reserved for non-towered airports with little to no data.
3.04-7  Selected Forecast of Aircraft Operations

Each of the projections shown in Table 3-7 were generated using accepted methodologies. Therefore, selection of a preferred forecast largely depends on the data used and how the associated assumptions fit actual airport activity. While there was a significant drop in operations during 2012, it must not be forgotten that the airport has experienced significant growth over the past decade. Since the tower first started recording operations on October 19th, 2009, it has consistently been the one of the busiest FAA contract towers in Florida as well as in the nation. For the first two years it was the busiest in Florida and the 2nd busiest in the nation. This ranking slipped to the 2nd busiest in Florida and 5th in the nation for 2012.

<table>
<thead>
<tr>
<th>Year</th>
<th>Previous Master Plan</th>
<th>Statewide System Plan</th>
<th>General Aviation Fleet Utilization</th>
<th>Projection by Type of Operation</th>
<th>National Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>153,585</td>
<td>153,585</td>
<td>153,585</td>
<td>153,585</td>
<td>153,585</td>
</tr>
<tr>
<td>Forecast</td>
<td>182,323</td>
<td>164,980</td>
<td>169,932</td>
<td>183,907</td>
<td>186,341</td>
</tr>
<tr>
<td>2023</td>
<td>210,338</td>
<td>175,119</td>
<td>184,875</td>
<td>202,277</td>
<td>196,359</td>
</tr>
<tr>
<td>2033</td>
<td>279,944</td>
<td>197,306</td>
<td>218,821</td>
<td>244,763</td>
<td>219,326</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

Many would agree that 2012 was marked with high levels of uncertainty, as much of the year was consumed by a presidential campaign having party platforms with very different views on how to improve the nation’s economy. This gave pause to many industries and operators of general aviation aircraft to do much of anything, resulting in 2012 being a “wait and see” year. The result was limited, if any growth in the economy and general aviation industry.

Regardless, the selection of a forecast for the 20-year planning period needs to look past the temporary impacts this period had on Flagler’s and the nation’s activity levels. The forecast selection needs to also take into account the significant airport improvements that have occurred, those that are underway, and the ones already proposed in the next few years. Finally, no future projection should be selected if it might include embedded constraints of the airport’s potential growth.

Despite the statements above and the numerous positive outlooks for the general aviation industry, it is not believed that the growth rate from the previous master plan can be sustained throughout the planning period. While the short term projections are
similar to other outlooks, the nearly three percent annual growth generates figures for the intermediate and long term planning periods that are hard to justify.

Conversely, the projection based on the most recent Florida statewide system plan is considered too conservative. While the 1.2 percent annual growth is a plausible scenario, the potential for different types of activity to expand at Flagler exists. Even though the airport’s region of the statewide system plan has a significant level of tourism, flight training, and other industries requiring aviation, the projection does not reflect the short term recovery or long term growth anticipated.

The model incorporating the future general aviation fleet utilization rates is rational for the end of the planning period, but considered constrained for the short term. It is assumed the reason may be related to the fact that a majority of the current operations are already being conducted by high utilization single-engine piston aircraft. In other words, the growth that would be predicted by this model is already occurring by the area flight schools, thus the low growth at the onset of the projection.

The market share analysis essentially creates a performance index between the activity at Flagler and all other airports with an ATCT in the nation. The index is then utilized with the FAA’s expected level of operations for all towered airports through 2032. This approach for estimating future operations is justified given that Flagler has ranked between the 60th and 74th busiest airport of the nation’s 514 towered airports. This ranking includes all commercial service airports such as the Atlanta, Chicago O’Hare, and Dallas-Ft. Worth International Airports to name a few.

The total combined operations for all of the nation’s airports with an ATCT have declined from 2000 to 2011. The first year of the FAA’s forecast predicted this decrease to continue another 1.2 percent between 2011 and 2012. Then starting in 2013, the FAA expects the decline to end and actually projects a 1.0 percent annual rate of growth through 2032. What is interesting to note, is that the actual decrease between 2011 and 2012 was much less than the FAA projected. Instead of a 1.2 percent decrease nationally, it was only 0.3 percent. This overall outlook is very similar to what has happened and is expected to occur at Flagler. As such, the market share analysis creates a very realistic and reasonable forecast for the planning period.

While the market share analysis is considered a good forecast overall, the projection generated by evaluating the types of operations separately is considered better. Both result in very similar forecasts, but the projection by type of operation model is considered to be more specific to the actual activity occurring at Flagler. As described, the information obtained from representatives at both ERAU and Phoenix East Aviation document that their flight training programs have actually grown through the period where many other segments of the industry have declined or altogether failed. The enrollment for both programs and the resulting flight activity that is generated is somewhat insulated from fluctuations in the national economy. For ERAU, students are typically enrolled in a long term degree program which helps
bridge short term fluctuations in the economy or industry such as those witnessed in 2012. Both programs, especially Phoenix East, also have a significant number of foreign flight students which further protects them from the nation’s recent economic challenges.

Additionally, using a correlation to accurate fuel sales in the operations by type forecasts significantly helps define what occurred in the past, prior to the official ATCT counts. As such, the composite forecast made up of independently projecting the primary types of activity at Flagler is considered to be the most specific and dependable estimate for this study. The combined projections from this methodology result in an average annual growth rate of 2.2 percent. However, this model’s projections also generate a slightly higher growth rate for the first part of the planning period, which supports the expected growth that will occur after the losses experienced between 2011 and 2012. Therefore, the projection by type of operation model was selected for use in the rest of this study.

3.05 TYPES OF AIRCRAFT OPERATIONS

The following sections address the types of aviation activity that will make up the forecasted operations. This includes a break out of the local, itinerant, and instrument operations. Further analyses include determining the operational aircraft fleet mix and estimates of the activity peaks for the planning period.

3.05-1 Local versus Itinerant Split

According to the historic ATCT counts, the split between local and itinerant traffic has remained relatively constant with local operations averaging 72.6 percent. While only a slight change is expected in the percentages, the results reflect the expectation that itinerant operations will increase over the planning period. Certainly flight training will continue to be a predominant generator of activity; however, even the reduced share for local still accounts for the growth of training included in the forecast of annual operations.

| TABLE 3-8 | FORECAST OF LOCAL VERSUS ITINERANT OPERATIONS |
|---|---|---|---|
| 2012 | Local Operations | 111,418 | 72.5% | Itinerant Operations | 42,167 | 27.5% | Total | 153,585 |
| Forecast | 2018 | 130,574 | 71% | 53,333 | 29% | 183,907 |
| | 2023 | 141,594 | 70% | 60,683 | 30% | 202,277 |
| | 2033 | 168,887 | 69% | 75,876 | 31% | 244,763 |

Source: C&S Engineers, Inc.
The increase in itinerant activity is supported by the surrounding area growth, airport improvements, and the expected expansion of business/corporate aviation. All of this is further bolstered by the fact that the airport remains an attractive destination for many pilots, both business and pleasure due to the availability of services, low fuel prices, and even High Jackers Restaurant. In addition, it should be noted that the growth of based aircraft at an airport does not typically increase the level of local operations like flight training. Therefore, throughout the planning period it is anticipated that there will be a continued shift towards more itinerant operations.

3.05-2 Instrument Operations

A separate count of the instrument operations conducted is important to evaluate for future facility requirements. Using the monthly ATCT activity logs, the average number of instrument flight rule (IFR) operations was calculated. The counts showed a range of 0.9 to 3.4 percent for the monthly IFR operations, with an overall annual average of 1.8 percent. To provide an estimate of future IFR operations, the annual average was applied to the forecast of total operations and is included in Table 3-12.

It should be noted that this percentage is lower than the actual percentage of the year that the airport experiences IFR conditions. Based on the ten years’ worth of hourly weather observations, IFR conditions have been observed 3.7 percent of the time for the area.

3.05-3 Operational Fleet Mix

Operational fleet mix is an important factor in determining the needs for airfield improvements. While the airport supports all types of aircraft, a majority of the current operations are conducted by single-engine since this is the predominate aircraft used for flight training. With the exception of IFR flight plans, ATCT counts do not include the type of aircraft conducting takeoffs or landings. Therefore, the current operational fleet mix percentages are based on information provided by ATCT and airport management, as well as the activity data provided by area flight schools.

Information from the 2012 FAA Aerospace Forecasts was then utilized to project how the operational fleet mix would change over the next 20 years. The FAA anticipates growth and increased utilization for every aircraft category with the exception of the piston single-engine and piston multi-engine types. As described previously, the most significant growth and utilization will be realized in the jet and turbine rotorcraft categories. For this analysis, the other category (includes gliders and balloons) has been omitted since their numbers are insignificant at Flagler. For the most part the projections reflected in Table 3-9 follow the national trend.

The jet activity will initially include a number of the light to medium sized business jets which have a maximum allowable takeoff weight between 10,000 and 60,000
This group includes the Beechcraft Hawker, Bombardier Learjet, Cessna Citation, Dassault Falcon, and Raytheon Hawker type jet aircraft that currently operate into Flagler County on a regular basis. However, jet activity in the short term will also see an increase in the current activity conducted by the much larger and heavier business jet fleet over 60,000 pounds. This would include the Bombardier Global Express, largest Dassault Falcons, and Gulfstream series of aircraft, all of which currently utilize Flagler. Both the Boeing Business Jet and Airbus Corporate Jet are also expected to operate into Flagler during the course of the planning period.

**TABLE 3-9**  
**PROJECTED OPERATIONAL FLEET MIX**

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2018</th>
<th>2023</th>
<th>2033</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine</td>
<td>115,189</td>
<td>128,735</td>
<td>135,526</td>
<td>141,963</td>
</tr>
<tr>
<td>Multi-Engine (piston &amp; turboprop)</td>
<td>27,645</td>
<td>34,942</td>
<td>36,410</td>
<td>39,161</td>
</tr>
<tr>
<td>Jet</td>
<td>7,679</td>
<td>12,873</td>
<td>20,227</td>
<td>48,953</td>
</tr>
<tr>
<td>Rotorcraft</td>
<td>3,072</td>
<td>7,357</td>
<td>10,114</td>
<td>14,686</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>153,585</td>
<td>183,907</td>
<td>202,277</td>
<td>244,763</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

Rotorcraft operations will continue to be conducted by the Bell, Eurocopter, and Robinson models currently based at the airport. Rotorcraft operations will also continue to include models from the different branches of the military as well as those operated by the State of Florida Division of Forestry. The future rotorcraft activity is projected to include flight training, law enforcement and emergency medical operators.

### 3.05-4 Peak Activity Estimates

Annual projections provide a good overview of the activity at an airport, but may not reflect certain operational characteristics of the facility. In many cases, facility requirements are not driven by annual demand, but rather by the capacity shortfalls and delays experienced during peak times. Therefore, forecasts are developed for the peak month, the average day in the peak month, and the peak hour of the peak day. Review of the monthly ATCT activity logs show that the month of April has consistently been the busiest at Flagler. Over the past three years, operations during this peak month have averaged 10.4 percent of the annual operations.

The values for average day peak month and for the peak hour were then calculated using the methodology in FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*. Under this methodology, the average day peak month is derived by taking the number of operations calculated for the peak month and dividing that figure by the number of days in the peak month. In this case, 30 days were utilized for April. The hourly data for each monthly record for April
was then analyzed to calculate the peak hour operations at the airport. For the three years of ATCT data, the peak months have peak hour operations that average 14.7 percent. It is assumed that these peaking characteristics will continue throughout the planning period.

<table>
<thead>
<tr>
<th></th>
<th>Total Annual Operations</th>
<th>Peak Month</th>
<th>Average Day Peak Month</th>
<th>Peak Hour (ADPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>153,585</td>
<td>15,973</td>
<td>532</td>
<td>78</td>
</tr>
<tr>
<td>Forecast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>183,907</td>
<td>19,126</td>
<td>638</td>
<td>94</td>
</tr>
<tr>
<td>2023</td>
<td>202,277</td>
<td>21,037</td>
<td>701</td>
<td>103</td>
</tr>
<tr>
<td>2033</td>
<td>244,763</td>
<td>25,455</td>
<td>849</td>
<td>125</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

### 3.06 FAA TERMINAL AREA FORECAST COMPARISON

If an airport is included in the FAA TAF, any new aviation activity forecasts need to be reviewed and approved by the agency before they can be applied to further analyses. During this review the FAA looks to see if the based aircraft and annual operations forecasts differ from the TAF by less than ten percent in the five year and 15 percent in the ten year planning period.

<table>
<thead>
<tr>
<th>Selected Forecasts</th>
<th>2012 FAA TAF</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based Aircraft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base Year (2013)</td>
<td>79</td>
<td>54</td>
</tr>
<tr>
<td>5 Year (2018)</td>
<td>93</td>
<td>59</td>
</tr>
<tr>
<td>10 Year (2023)</td>
<td>109</td>
<td>64</td>
</tr>
<tr>
<td>Annual Aircraft Operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base Year (2012)</td>
<td>153,585</td>
<td>159,696</td>
</tr>
<tr>
<td>5 Year (2018)</td>
<td>183,907</td>
<td>168,035</td>
</tr>
<tr>
<td>10 Year (2023)</td>
<td>202,277</td>
<td>175,945</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

As shown, the forecast of based aircraft exceeds the criteria set by the FAA for approval while annual operations are within. Regarding the FAA review, the FAA
Director of Airport Planning and Programming (APP-1) published a guidance paper in June 2008 entitled, *Review and Approval of Aviation Forecasts*. This guidance states:

“If the forecast is not consistent with the TAF, differences must be resolved if the forecast is to be used in FAA decision-making. This may involve revisions to the airport sponsor’s submitted forecasts, adjustments to the TAF, or both. FAA decision-making includes key environmental issues (e.g. purpose and need, air quality, noise, land use), noise compatibility planning (14 CFR Part 150), approval of development on an airport layout plan, and initial financial decisions including issuance of LOI’s and calculation of BCA’s.”

With respect to the based aircraft, the last historic year for the TAF (2011) shows 52 based aircraft at Flagler. This figure comes from the National Based Aircraft Inventory Program. As documented in this chapter, using the validated aircraft data to create based aircraft projections does not create information that is useful in this master plan study. In addition, the National Based Aircraft Inventory Program validated 56 aircraft at Flagler in 2012. In the 2012 TAF, this number is not forecasted to occur until 2015, therefore illustrating the fact that the TAF projections are not reasonable. The projections in the TAF will be even more unrealistic once the new aircraft resulting from the new 20 unit t-hangar are added for 2013, even if only a few are validated. For these reasons, the deviation from the TAF is not considered significant.

### 3.07 DEMAND FORECAST SUMMARY

*Table 3-12* presents an overview of the selected forecasts. In summary, the data and methods used to forecast aviation demand for the airport are consistent with those used by the FAA and other general aviation airports around the nation. The forecasts presented in this study are considered to reasonably reflect the activity anticipated at Flagler County through 2033 given the information analyzed and available during this study.
### TABLE 3-12
**SUMMARY OF AVIATION DEMAND FORECASTS**

<table>
<thead>
<tr>
<th></th>
<th>2012*</th>
<th>2018</th>
<th>2023</th>
<th>2033</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Based Aircraft</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-Engine</td>
<td>58</td>
<td>66</td>
<td>71</td>
<td>92</td>
</tr>
<tr>
<td>Multi-Engine (piston &amp; turboprop)</td>
<td>13</td>
<td>14</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>Jet</td>
<td>2</td>
<td>5</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Rotorcraft</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>79</td>
<td>93</td>
<td>109</td>
<td>151</td>
</tr>
<tr>
<td><strong>Operations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td>111,418</td>
<td>130,574</td>
<td>141,594</td>
<td>168,887</td>
</tr>
<tr>
<td>Itinerant</td>
<td>42,167</td>
<td>53,333</td>
<td>60,683</td>
<td>75,876</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>153,585</td>
<td>183,907</td>
<td>202,277</td>
<td>244,763</td>
</tr>
<tr>
<td>Instrument Operations</td>
<td>2,769</td>
<td>3,310</td>
<td>3,641</td>
<td>4,406</td>
</tr>
<tr>
<td><strong>Operational Fleet Mix</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-Engine</td>
<td>115,189</td>
<td>128,735</td>
<td>135,526</td>
<td>141,936</td>
</tr>
<tr>
<td>Multi-Engine (piston &amp; turboprop)</td>
<td>27,645</td>
<td>34,942</td>
<td>36,410</td>
<td>39,161</td>
</tr>
<tr>
<td>Jet</td>
<td>7,679</td>
<td>12,873</td>
<td>20,227</td>
<td>48,953</td>
</tr>
<tr>
<td>Rotorcraft</td>
<td>3,072</td>
<td>7,357</td>
<td>10,114</td>
<td>14,686</td>
</tr>
<tr>
<td><strong>Peak Activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Month Operations</td>
<td>15,973</td>
<td>19,126</td>
<td>21,037</td>
<td>25,455</td>
</tr>
<tr>
<td>Average Day Operations</td>
<td>532</td>
<td>638</td>
<td>701</td>
<td>849</td>
</tr>
<tr>
<td>Peak Hour Operations</td>
<td>78</td>
<td>94</td>
<td>103</td>
<td>125</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

*Base year for based aircraft if 2013
CHAPTER 4 - CAPACITY ASSESSMENT AND FACILITY REQUIREMENTS

To ensure that the Flagler County Airport will adequately accommodate demand expected during the 20-year planning period, this chapter evaluates the airport capacity and establishes the improvements required to maintain a safe and efficient facility. Because airport development is costly and facilities should last for many years, care must be taken to ensure that each project will effectively satisfy the needs identified.

4.01 AIRPORT CAPACITY

Airport capacity is defined by the Federal Aviation Administration (FAA) as a measure of an airfield's ability to accommodate the maximum number of aircraft operations. Estimates of airfield capacity at Flagler were developed in accordance with the methods presented in FAA Advisory Circular (AC) 150/5060-5, Change 2, Airport Capacity and Delay. Methodologies from this AC were used to calculate the hourly capacity of the runway system and annual service volume (ASV) of the airfield. These calculations were based upon the specific airfield, operational, and meteorological characteristics of the airport on a typical day.

4.01-1 Airfield Geometry

The airfield configuration is the primary factor in determining the overall airport capacity due to its direct influence on how aircraft can operate. In theory, as the number of runways and taxiways increase, so should the capacity at a given airfield. However, the physical orientation and proximity of the various runway and taxiway surfaces may or may not contribute to the overall airfield capacity.

RUNWAY CONFIGURATION

For the capacity analysis, only the two paved runways will be considered since the water runway (sea lane) on Gore Lake only accommodates seaplanes or amphibious aircraft. The primary runway, Runway 11-29, has a predominantly east to west alignment while the crosswind runway, Runway 06-24, has a northeast to southwest orientation (see Figure 2-1).

Currently the approach ends of Runway 29 and Runway 24 intersect to form what is referred to as a “closed V” configuration. Typically this configuration results in only one runway being utilized at a time. However, when Runway 24 is the active runway, the air traffic control tower (ATCT) can sequence departures off Runway 29, but only if they are leaving the airport area and will not conflict with traffic in the
Runway 24 pattern. The same scenario is possible for departures off Runway 24 when Runway 11-29 is the active runway.

It should be noted that a project to relocate Runway 11-29 to the south by 400 feet is under design at the time of this writing. This project was recommended in the 2005 Airport Master Plan Update for a number of reasons, including eliminating the “closed V” configuration. The orientation of these two runway ends, which are only served by Taxiway A, create a very critical area on the airfield with respect to safety. Even with an active ATCT, this geometry can be confusing to pilots and has been designated as a “hot spot” on the airport for aircraft operations. Relocating Runway 11-29 south will create a true runway intersection, thus eliminating the confusing geometry. This is important to consider here, as the project is not related to airport capacity. In fact, the same runway-use diagram from the FAA *Airport Capacity and Delay AC* would apply to the existing runway configuration as well as that when the relocation project is completed.

**EXIT TAXIWAYS**

The capacity of a runway system is greatly influenced by the ability of an aircraft to exit the runway as quickly and safely as possible. Once an aircraft has left the runway, another one is able to either land or takeoff. Therefore, the number and location of exit taxiways directly influence runway occupancy time and therefore the overall capacity of the system. Capacity is greatly enhanced if a full-length, parallel taxiway is provided for each runway as these taxiways generally have several connector taxiways, which increases the number of exits from the runway.

Both runways at Flagler County have full length parallel taxiways with multiple connectors. However, in the FAA methodology, the calculations use an exit factor based upon the number of connector taxiways within a certain range. The optimal range for exit taxiways varies for different runway configurations and is primarily based on the aircraft mix index (described in a following section). For the entire planning period, this range for Flagler is 2,000 feet to 4,000 feet from the landing threshold and each exit must be separated by at least 750 feet. Using these criteria, the number of exits with respect to capacity calculations is listed in Table 4-1 for the current condition and after Runway 11-29 is relocated, including the new parallel taxiway layout.
## TABLE 4-1
### NUMBER OF TAXIWAY EXITS

<table>
<thead>
<tr>
<th>Runway</th>
<th>2012 Airfield Configuration</th>
<th>After Relocation of Runway 11-29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway 11</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Runway 29</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Runway 06</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Runway 24</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

### 4.01-2 Operational Characteristics

Operational characteristics include the aircraft mix index, the percentage of aircraft arrivals, and the percentage of aircraft touch and go operations. Each of these are described in the following sections as they can have a significant impact on the overall runway occupancy time individually or collectively.

#### AIRCRAFT MIX INDEX

The operational fleet influences an airfield’s capacity based upon differing aircraft requirements. The FAA has designated four categories of aircraft for capacity determinations which are based upon the maximum certificated takeoff weight, the number of engines, and the wake turbulence classifications. In the simplest terms, larger aircraft create more wake turbulence and therefore require more spacing (therefore time) so that the turbulence can subside before another aircraft travels through that same area. Likewise, as an aircraft’s size and weight increases, so does the time needed for it to slow to a safe taxiing speed or to achieve the needed speed for takeoff. Therefore, larger aircraft require more runway occupancy time than smaller ones. For these reasons, aircraft classifications are used to determine the aircraft mix index, necessary to calculate airfield capacity.

The mix index is calculated by adding the percent of Class C aircraft plus three times the percent of Class D aircraft, which can be written as \(\% (C + 3D)\). The percent of Class A and B aircraft (both under 12,500 pounds) is not considered to significantly affect airfield capacity because the wake turbulence generated by these smaller aircraft dissipates fairly rapidly. Thus other aircraft can be spaced closer to Class A and B aircraft than to a Class C or D aircraft. Class C aircraft include multi-engine aircraft greater than 12,500 pounds but less than 300,000 pounds with a large wake turbulence classification. Class D are multi-engine aircraft over 300,000 pounds with a heavy wake turbulence classification. It should be noted that these capacity classes differ from the Aircraft Approach Categories described in subsequent sections of this chapter.
For Flagler, the current and future activity includes Class A, B, and C aircraft. The Class C aircraft primarily consist of business jets, but also includes the occasional military aircraft and military rotorcraft. Even though there are business jets less than 12,500 pounds operating at the airport, for planning purposes, all of the jet aircraft in the operational fleet mix will be considered as Class C aircraft. This helps create a more conservative evaluation of the current and future runway capacity. It also accounts for the operations conducted by turboprops and rotorcraft over 12,500 pounds, which are not segregated in the operational fleet mix figures. Therefore, the aircraft mix index for the planning period will increase from 5 during the 2012 base year to 7 in 2018, 10 in 2023, and 20 in 2033.

PERCENTAGE OF AIRCRAFT ARRIVALS

The percentage of arrivals is simply the ratio of aircraft arrivals to total operations during a peak or average hour of operations. The FAA methodology considers a 40, 50, or 60 percent arrivals factor to compute airfield capacity. Since aircraft on final approach are given priority over departures, higher percentages of arrivals during peak periods of operations can reduce the hourly capacity due to the longer runway occupancy times for arrivals over departures. However, this is typically only considered significant for airports which have a majority of operations conducted by commercial airlines. At general aviation airports, the percentage of arrivals is assumed to equal those of departures for any given time, even the peak hour. Therefore, the 50 percent arrivals factor (for the average hour of operations) was applied to the various capacity calculations.

PERCENTAGE OF TOUCH AND GO OPERATIONS

A touch and go operation refers to a training procedure in which the pilot performs a normal landing followed by an immediate takeoff, without stopping or taxiing clear of the runway. While each touch and go operation actually accounts for two runway operations (one landing and one takeoff), this procedure typically takes less time than two operations by separate aircraft. Therefore, airports with a high percentage of touch and go operations will have a greater airfield capacity than a similar airport with less of these training operations.

The level of touch and go activity at Flagler is significant due to the flight training conducted at the airport by some of the nation’s largest flight schools. It was estimated that 70 percent of the flights conducted were related to training. Of these, interviews with airport and ATCT management, as well as representatives of Embry-Riddle Aeronautical University (ERAU) and Phoenix East Aviation, Inc. estimated that of the flight training activity, 75 percent were touch and go operations. For 2012, this would represent 52.5 percent of the total annual operations. While an estimate for the future level has not been made, it is fully anticipated that the same level of touch and go operations will continue. This assumption does not create any problems given that the highest touch and go factor of the FAA capacity tables is a 41 to 50.
percent range. In other words, all of the capacity calculations for Flagler will be based on the highest touch and go factor allowed.

4.01-3 Meteorological Conditions

An airport’s meteorological conditions can significantly influence the utilization and therefore capacity of the airfield layout. Variations in the weather resulting in limited cloud ceilings and reduced visibility typically lower airfield capacity, while changes in wind direction and velocity will dictate runway usage.

CEILING AND VISIBILITY

As weather conditions deteriorate, pilots must rely on instruments to define their position both vertically and horizontally. Capacity is lowered during such conditions because aircraft are spaced further apart when they cannot see each other. For capacity calculations, the FAA defines three general weather categories, based upon the height of the clouds above ground level and visibility.

- Visual Flight Rules (VFR): Cloud ceiling is greater than 1,000 feet above ground level (AGL) and visibility is at least three statute miles.
- Instrument Flight Rules (IFR): Cloud ceiling is at least 500 AGL but less than 1,000 feet AGL and/or visibility is less than three statute miles but more than one statute mile.
- Poor Visibility and Ceiling (PVC): Cloud ceiling is less than 500 feet AGL and/or visibility is less than one statute mile.

Since Flagler has instrument approach procedures established to all four runway ends, the airport is capable of accommodating aircraft during IFR conditions. However, most airports, even those with precision approach capabilities, have limited operations during actual PVC conditions. Using the meteorological data collected for this study, the Flagler County area experiences VFR conditions 95.5 percent of the time, IFR conditions 3.7 percent of the time, and PVC conditions 0.8 percent of the time.

WIND COVERAGE AND RUNWAY UTILIZATION

The wind coverage analysis presented in the inventory chapter showed that on average, Runway 06-24 had slightly better coverage than the primary runway. While both runways provide high percentages of crosswind coverage, it is only under the 10.5 knot category that Runway 11-29 requires another runway orientation to achieve the required crosswind coverage of 95 percent. However, wind coverage is not the only factor that determines the operational flow, especially at an airport with an ATCT.
Since records are not kept on specific runway end use, the estimates shown in Table 4-2 were based on discussions with ATCT management. While these percentages correspond with the calculations for crosswind coverage, especially given the numerous light aircraft conducting training flights, there are other reasons that Runway 06-24 is currently used more often. One is the simple fact that the standard traffic patterns for Runway 06-24 are easier for the ATCT to manage. Aircraft that are going downwind to set up for the base leg and final approach to Runway 11 are more difficult for the controllers to see, as this is the furthest point from the ATCT to any of the airport’s traffic patterns. In fact, the use of Runway 11 as the active runway primarily occurs in the summertime when the afternoon breeze coming in from the ocean requires that runway for most aircraft. Also, a majority of the flight training traffic arrives from and departs to the Daytona Beach area. Thus, either end of Runway 06-24, and to some extent Runway 29, are favored for the sequencing of aircraft in and out of the traffic pattern.

**TABLE 4-2**

**RUNWAY UTILIZATION**

<table>
<thead>
<tr>
<th>Runway</th>
<th>Combined</th>
<th>Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway 11</td>
<td></td>
<td>40%</td>
</tr>
<tr>
<td>Runway 29</td>
<td>10%</td>
<td>30%</td>
</tr>
<tr>
<td>Runway 06</td>
<td>30%</td>
<td>60%</td>
</tr>
<tr>
<td>Runway 24</td>
<td>30%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

### 4.01-4 Airfield Capacity Calculations

The preceding airfield geometry, operational characteristics, and meteorological conditions were first utilized to calculate hourly capacity. The results were then applied to determine the annual service volume in order to evaluate the ability of the airfield to accommodate the projected demand.

**HOURLY CAPACITY OF THE RUNWAY SYSTEM**

The hourly capacity for Flagler was calculated by analyzing the appropriate runway-use diagrams and figures for both VFR and IFR conditions. From the diagrams and figures, the aircraft mix index and percent of aircraft arrivals are utilized to calculate the hourly capacity base. Next, a touch and go factor is determined using the percentage of touch and go operations with the aircraft mix index. Finally, the taxiway exit factor is determined by the aircraft mix index, percent of aircraft arrivals, and number of exit taxiways.
A weighted hourly capacity is then calculated (Table 4-3) based on the percent that VFR and IFR conditions have historically been observed for each different operational flow. Estimates were not included for PVC conditions since Flagler does not have any published instrument approaches for these ceiling and visibility minimums. Likewise, the number of departures during times of PVC is considered insignificant with respect to estimating hourly capacity.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Average VFR Hourly Capacity</th>
<th>Average IFR Hourly Capacity</th>
<th>Weighted Hourly Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>131</td>
<td>62</td>
<td>128</td>
</tr>
<tr>
<td>Forecast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>127</td>
<td>61</td>
<td>123</td>
</tr>
<tr>
<td>2023</td>
<td>126</td>
<td>60</td>
<td>122</td>
</tr>
<tr>
<td>2033</td>
<td>123</td>
<td>58</td>
<td>120</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

It should be noted that the figures for 2012 are based on the existing airfield configuration while those for the forecast years are based on the configuration once Runway 11-29 has been relocated 400 feet south. However, the two layouts did not result in very significant changes to the capacity calculations since they use the same runway-use diagrams. The primary difference was due to the proposed modifications to the connector taxiways in the current Runway 11-29 relocation plans. Regardless, the decreases in weighted hourly capacity are the result of the additional larger and/or jet aircraft operations expected in the future (i.e. increase in mix index).

ANNUAL SERVICE VOLUME

Annual service volume (ASV) is the most important value that must be computed in order to understand the capacity at a general aviation airport. It represents the number of total operations that an airfield can support annually. In other words, ASV is the theoretical limit of operations that the airport can safely accommodate without delay occurring on a regular basis. To calculate ASV, first the ratio of annual demand to average daily demand, during the peak month, is calculated. Next, the ratio of average daily demand to average peak hour demand, during the same time is determined. These values are then multiplied together with the corresponding weighted hourly capacity to compute ASV.
### TABLE 4-4
AIRFIELD CAPACITY ANALYSIS

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Operations</th>
<th>Annual Service Volume (ASV)</th>
<th>Capacity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>153,585</td>
<td>250,640</td>
<td>61%</td>
</tr>
<tr>
<td>Forecast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>183,907</td>
<td>241,849</td>
<td>76%</td>
</tr>
<tr>
<td>2023</td>
<td>202,277</td>
<td>239,578</td>
<td>84%</td>
</tr>
<tr>
<td>2033</td>
<td>244,763</td>
<td>235,036</td>
<td>104%</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

A demand that exceeds ASV results in significant delays on the airfield. However, no matter how substantial an airport’s capacity may appear, it should be realized that delays can occur even before an airport reaches its stated capacity. In fact, according to FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, capacity enhancing projects need sufficient lead times so that the improvements can be properly planned, designed, and constructed before the resulting delays become critical. For most every type of capacity enhancing project, the FAA recommends planning for such improvements when the activity levels reach 60 to 75 percent of the annual capacity. The Flagler County Airport is already within this range. In fact, when the annual operations recorded at Flagler in 2010 and 2011 are compared to the base year ASV, the result is 69 and 70 percent of capacity, respectively.

#### 4.01-5 Recommendations for Capacity Enhancement

Adequate airfield facilities are necessary for the overall airport system to function properly. Therefore, airside improvements, which could range from additional taxiway exits, improved instrument approaches, and/or an additional runway, need to be addressed. Likewise, in order to achieve a balanced airfield system, other facility improvements such as aircraft parking, hangar, general aviation terminal space, automobile parking, or utilities also need to be addressed since they were not included in this airport capacity analysis. The following sections will delineate the various facilities required to accommodate the future demand identified. That information, in addition to the capacity analysis, will provide the basis for formulating the development options of the airport. Finally, since the figures in Table 4-4 are based on the approved forecasts, any additional activity would clearly accelerate the need and timeline for improvements.
4.02 AIRPORT DESIGN CRITERIA

A substantial revision to the FAA’s standards for airport design was released on September 28, 2012 when the agency issued AC 150/5300-13A, Airport Design. Additional modifications to the new criteria were issued in Change 1 to the AC on February 26, 2014. Airport planning and design requires the selection of one or more critical design aircraft. These are still defined as the most demanding aircraft for a specific airport component, which conducts or is expected to conduct a minimum of 500 annual itinerant operations. However, the use of these aircraft to classify airport facilities has changed to include Approach Reference Codes (APRC), Departure Reference Codes (DPRC), Runway Design Codes (RDC), and Taxiway Design Groups.

4.02-1 Runway Reference and Design Codes

Approach and departure codes identify the runway’s current landing and takeoff capabilities where no special operating procedures are required. As such, runways can have more than one APRC or DPRC code for different aircraft groupings and these codes may change as airfield improvements are made. The RDC indicates the future runway requirements. In other words, APRC and DPRC reflect existing operational limitations while the RDC is used for planning future design standards.

For all three codes, the first component is the Aircraft Approach Category which is depicted by a letter and relates to the aircraft’s approach speed (operational characteristic). The second component is the Airplane Design Group (ADG) which uses Roman numerals to identify the critical aircraft wingspan or tail height (physical characteristics). For APRC and RDC, a third component relates to the visibility minimums associated with the runway or group of runways. For runways with only existing or future visual approaches, the third component should be “VIS” in lieu of the visibility minimums. The ranges for the three components are included in the tables below.

<table>
<thead>
<tr>
<th>AIRCRAFT APPROACH CATEGORY</th>
<th>Approach Speed (knots)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt; 91</td>
</tr>
<tr>
<td>B</td>
<td>91 &lt; 121</td>
</tr>
<tr>
<td>C</td>
<td>121 &lt; 141</td>
</tr>
<tr>
<td>D</td>
<td>141 &lt; 166</td>
</tr>
<tr>
<td>E</td>
<td>166 +</td>
</tr>
</tbody>
</table>

Source: FAA AC 150/5300-13A, Change 1, Airport Design.
4.02-2 Critical Design Aircraft

While the airport accommodates various types of aircraft up to and including those with the runway components of C-III, the current critical design components for both runways is C-II. The current APRCs for both runways are B-III-5000 and D-II-5000, meaning the occasional larger ADG III aircraft must operate with certain limitations and/or obtain prior approval from the airport when operating during certain instrument conditions. Similarly, the DPRCs for both runways are B-III and D-II, indicating special operating procedures might be required for some of the larger C-III aircraft that operate at Flagler.

These current C-II designation accommodates nearly every jet aircraft with a maximum takeoff weight that is more than 12,500 pounds but less than or equal to 60,000 pounds, as well as a number of business jets with a weight greater than 60,000 pounds. Regardless, a number of the larger aircraft still operate under certain weight restrictions due to the runway length available at Flagler.

A majority of the jet operations at Flagler are conducted by light to medium sized business jet aircraft such as the Beechcraft Hawker, Bombardier Challenger, Bombardier Learjet, Cessna Citation, and Dassault Falcon series aircraft. The larger
jet aircraft (over 60,000 pounds) include models from the Bombardier Global Express, Dassault Falcon, and Gulfstream series. While no single aircraft in this upper range conducts 500 annual itinerant operations, collectively the group does and the Gulfstream G450 has been selected as the current representative critical aircraft for both runways.

Due to the expected increase in both the size and number of business jet aircraft at Flagler, as well as improved instrument approach minimums, a RDC of C-III-2400 must be planned for the future. While C-III aircraft do occasionally operate on Runway 06-24, the runway length is limited due to a number of physical constraints. This coupled with the current project to relocate and extend Runway 11-29 by 501 feet, supports the ultimate RDC of C-III-2400 on the primary runway. For illustrative purposes, the Boeing Business Jet (BBJ) has been selected as the representative critical aircraft of this group, primarily due to the newer taxiway standards described in subsequent sections. The C-III group of aircraft also includes the Airbus Corporate Jet, Bombardier Global Express, Dassault Falcon series aircraft, and Gulfstream models such as the G550 and G650.

For Runway 06-24, the Gulfstream G450 will remain the critical aircraft over the course of the planning period. The approach visibility component will also remain the same as the current setbacks to various airport features (described in later sections) will not allow a decrease in the current instrument minimums. Therefore, the RDC for Runway 06-24 will be C-II-5000.

The dimensions of the sea lane (Runway 18W-36W) have been established based on the physical size of Gore Lake. There is no APRC or DPRC established since the sea lane does not have a parallel taxiway. However, the RDC for the facility is A-I-VIS, with the de Havilland Beaver (DHC-2) as the representative aircraft. The sea lane runway has also been designated for small aircraft only, which are those with a maximum certificated takeoff weight of 12,500 pounds or less.

### TABLE 4-8
RUNWAY CODES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11-29</td>
<td>Gulfstream G450</td>
<td>B-III-5000</td>
<td>B-III</td>
<td>C-III-2400 (BBJ)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D-II-5000</td>
<td>D-II</td>
<td></td>
</tr>
<tr>
<td>06-24</td>
<td>Gulfstream G450</td>
<td>D-VI-5000</td>
<td>D-VI</td>
<td>C-II-5000 (Gulfstream G450)</td>
</tr>
<tr>
<td>18W-36W</td>
<td>DHC-2 Beaver</td>
<td>n/a</td>
<td>n/a</td>
<td>A-I-VIS (DHC-2 Beaver)</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.
4.02-3 Taxiway Design Groups

Previously taxiways were solely based on the ADG (wingspan) of the critical aircraft they served. Now some of the taxiway design standards utilize a Taxiway Design Group (TDG) which is based on the overall width of the aircraft’s main gear as well as the distance between the main gear and the cockpit. Designation of the TDG is determined through the use of a chart in FAA AC 150/5300-13A, Change 1, Airport Design. This approach offers proper taxiway width and separation dimensions, while at the same time a better method for determining the required turning radii and edge fillets. The intent is to provide the appropriate taxiway geometry while minimizing excess pavement and limiting the potential for confusing layouts. As illustrated in the table below, it is possible to have different taxiway standards on an airfield, depending on which facilities they serve. Aircraft parking aprons and hangar areas will also vary based on the aircraft they serve and whether or not the facility is accessed via a taxiway or taxilane.

<table>
<thead>
<tr>
<th>TABLE 4-9 TAXIWAY DESIGN GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Runway 11-29</td>
</tr>
<tr>
<td>Runway 06-24</td>
</tr>
<tr>
<td>Runway 18W-36W</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

4.03 RUNWAY REQUIREMENTS

As the primary airfield component, a runway must have the proper length, width, and strength to safely accommodate the critical design aircraft. In addition to the physical characteristics of the runway, there are a number of other safety-related criteria including the requirement for a Runway Safety Area, Runway Object Free Area, Runway Protection Zones, and Obstacle Free Zones. Each of these as well as other runway requirements for Flagler are described in the following sections.

4.03-1 Additional Capacity

Additional capacity for the airfield will be needed as soon as practicable in order to accommodate the activity projected. As shown in the airport capacity assessment, the current demand has surpassed the 60 percent capacity level. Over the course of the short term planning period, this demand will increase to 76 percent and then 84 percent by the end intermediate planning period. It should be noted that these figures are based on the FAA approved forecasts for this study. Clearly any significant
activity that was not projected to occur would accelerate the need for these capacity improvements.

Specific enhancements to increase the hourly capacity of the runway configuration include improvements to the taxiway system such as additional exits for landing aircraft or run-up areas and bypass options for aircraft taking off. Improvements to an airport’s instrument approach capability can also increase the hourly capacity of the runway system during times of inclement weather. While all of these will be considered to improve the overall airfield, none will provide the additional capacity required to accommodate the demand projected.

The number of taxiway exits which improve the hourly capacity of a runway were shown in Table 4-1. For the Flagler capacity calculations, the exit factor is maximized when there are at least two exits meeting the appropriate criteria. As such, only Runway 06-24 would benefit from the construction of at least one additional exit within the appropriate range. However, even if the exits are maximized on both runways, it will not create the additional capacity needed. Similarly, while run-up areas or even bypass capability are needed at all four runway ends, the resulting increase in the ability to depart aircraft more efficiently will not significantly increase the overall capacity. And, while improved instrument approach capability would increase the safety and utilization of the airport during actual instrument conditions, a significant majority of operations are conducted during visual conditions.

Therefore, the only option to significantly increase the airport capacity is to consider a parallel runway to one of the existing runway orientations. As described previously, approximately 70 percent of the flights currently conducted are for flight training. Of these, over 50 percent of the total activity at Flagler is the result of touch and go operations. While the air traffic controllers occasionally sequence departures off the runway that is not being used for the predominant traffic flow, they need a parallel runway system to safely and efficiently manage this type of activity.

Given that the need for additional capacity is not related to inclement weather conditions, the new parallel runway would only require a 700 foot runway centerline to runway centerline separation, to allow simultaneous VFR operations. Under IFR, the level of activity is reduced enough that a single primary runway and crosswind runway operating environment would be sufficient to accommodate the demand during those conditions.

The airport capacity assessment calculations were re-run using a parallel runway system. For these, the same information was applied for the operational characteristics and meteorological conditions. The recalculations also assumed improvements to the taxiway systems would maximize the exit factor. The resulting increases in capacity after 2012 are shown in Table 4-10.
### TABLE 4-10
AIRFIELD CAPACITY WITH FUTURE PARALLEL RUNWAY

<table>
<thead>
<tr>
<th></th>
<th>Annual Operations</th>
<th>Annual Service Volume (ASV)</th>
<th>Capacity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>153,585</td>
<td>250,640</td>
<td>61%</td>
</tr>
<tr>
<td>Forecast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>183,907</td>
<td>477,897</td>
<td>38%</td>
</tr>
<tr>
<td>2023</td>
<td>202,277</td>
<td>435,899</td>
<td>46%</td>
</tr>
<tr>
<td>2033</td>
<td>244,763</td>
<td>379,033</td>
<td>65%</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

Additional requirements of a new parallel runway are addressed in the following sections while the layout options are evaluated in the airport alternatives chapter. The various configurations will include offsets to the parallel runway thresholds; however, these offsets will be to minimize any potential environmental impacts. Operationally, offset thresholds are only significant when simultaneous IFR approach and departure procedures must be established, which is not the case in this scenario.

The FAA will require that an Environmental Assessment for the proposed parallel runway be conducted. Because of the timeframe required to properly conduct the environmental review, as well as the actual design and construction of the improvements, the parallel runway system needs to be a priority of the short term development program.

Finally, it is also important to mention that under Florida law, all developments are subject to permit review under Chapter 380, Florida Statutes if the character, magnitude, or location would have a substantive effect upon the health, safety, or welfare of the citizens of Florida. This is known as the Development of Regional Impact (DRI) process. Under the current Florida Statutes, a new paved runway at a general aviation airport would require a DRI. However, the project would be exempt from the DRI review standards of Chapter 380 (as well as those outlined in Chapter 163 of the Florida Statutes) if it and the supporting documentation of the airport master plan process, have been incorporated into the local governmental comprehensive plan.

#### 4.03-2 Runway Length Analysis

AC 150/5325-4B, *Runway Length Requirements for Airport Design* provides the current FAA standards and methodologies for computing runway length. Use of this criterion is required when a project is intended to request or receive federal funding. Different methodologies for calculating runway length are provided in this guidance based on aircraft weight.
LENGTH REQUIRED FOR SMALL AIRCRAFT

Small aircraft are defined as those that have a maximum certificated takeoff weight of 12,500 pounds or less. The small aircraft group includes virtually every single and multi-engine (piston and turboprop) aircraft used for flight training. In fact, one of the largest aircraft used on a regular basis for flight training at Flagler is the Beechcraft King Air 90, which has a maximum takeoff weight of 9,650 pounds. Charts in FAA AC 150/5325-4B require the local mean daily maximum temperature (of the hottest month) and airport elevation to determine runway length for small aircraft. Temperature and airfield elevation determine the density altitude, which adversely impacts runway requirements. As the airfield elevation and/or average temperature increases, the minimum required runway length must also increase due to the higher density altitude which decreases any aircraft’s performance. The historic weather data for the area consistently showed July and August as the hottest months of the year, with both documented as having a mean high temperature of 91°F. The airfield elevation is 33 feet above mean sea level (AMSL).

Because a number of the larger turboprop and jet aircraft within this category use Flagler, the runway length curves for small airplanes having 10 or more passenger seats were utilized. This includes the larger, yet still less than 12,500 pound Beechcraft King Airs and Swearingen Metro II based at the airport. The result is a runway length requirement of 4,200 feet.

REQUIREMENTS FOR LARGE AIRCRAFT UP TO 60,000 POUNDS

Using approved aircraft flight manuals, FAA AC 150/5325-4B provides performance curves to determine the runway length required for airports supporting operations of large aircraft weighing between 12,500 and 60,000 pounds. In addition to the mean daily maximum temperature and airport elevation, information on the useful load factor, effective runway gradient, and typical weather conditions are required for the analyses of this weight group.

Useful load refers to the difference between an aircraft’s maximum allowable takeoff weight and the empty weight. As such, the useful load factor provides an indication of the amount of passengers, cargo, and fuel carried by an aircraft. In the FAA’s runway length calculations there is the option to select a 60 and 90 percent useful load factor. Basically, the heavier the aircraft (higher useful load percentage) the more runway length required. Because of the airport’s southeastern location within the nation, flights of 1,000 miles, 1,500 miles, or even longer (to get to the west coast) are common on a regular basis. However, the largest jet aircraft within this weight group can fly even greater distances than coast to coast; therefore, both the 60 and 90 percent useful loads were calculated.

The FAA performance curves for jet aircraft weighing 12,500 to 60,000 pounds are also split into the categories of 75 and 100 percent of the fleet. FAA AC 150/5325-
4B provides lists of the general aviation jet aircraft that represent 75 percent of the fleet flying in the U.S. This list combined with a second list represents 100 percent of the U.S. business jet fleet in this weight range. According to general statements in the AC, aircraft in the 75 percent group require 5,000 feet or less of runway, while the remaining 25 percent require at least 5,000 feet under standard atmospheric conditions (59°F at sea level).

The FAA’s 100 percent of the fleet table includes the larger Beechcraft Hawker, Bombardier Challenger, Bombardier Learjet, Cessna Citation, and Dassault Falcon series business jets. All of these aircraft conduct operations at Flagler on a regular basis. Therefore, both the 75 and 100 percent of the fleet categories were analyzed.

Applying local conditions to the performance curves yields an initial runway length requirement. Adjustments are then made to the initial lengths for either takeoff or landing operations, but not for both, as the increases cannot be cumulative. Takeoff adjustments are based on the difference in runway centerline elevation which is four feet for Runway 11-29 and three feet for Runway 06-24. Landing adjustments are only made for runways serving jet aircraft operations. For jet runways the length is increased by 15 percent to account for the decrease in landing performance under wet and slippery conditions. For 75 percent of the fleet, this results in a runway length requirement of 5,376 feet with a 60 percent useful load and 7,000 feet under the 90 percent useful load. For 100 percent of the fleet a runway length requirement of 5,500 feet for the 60 percent useful load and 8,565 feet for the 90 percent useful load are required.

<table>
<thead>
<tr>
<th>Useful Load</th>
<th>75 Percent of the Fleet</th>
<th>100 Percent of the Fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 Percent</td>
<td>5,376'</td>
<td>5,500'</td>
</tr>
<tr>
<td>90 Percent</td>
<td>7,000'</td>
<td>8,565'</td>
</tr>
</tbody>
</table>

Source: FAA AC 150/5325-4B (Figures 3-1 and 3-2).

**SPECIFIC LENGTH FOR AIRCRAFT GREATER THAN 60,000 POUNDS**

For aircraft over 60,000 pounds, runway length is determined by utilizing the individual aircraft performance charts. While the BBJ was selected as the overall representative critical aircraft of the future C-III group, the Grumman G550 has been utilized for evaluating future runway length requirements as it is slightly more demanding than the BBJ under certain operating conditions. Therefore, the performance charts for the Gulfstream G450 and G550 aircraft were evaluated to determine both takeoff and landing runway length requirements. As with any aircraft
performance charts a number of factors must be considered for the conditions expected.

For takeoffs the runway charts for 20 degrees of flaps was used for both the G450 and G550 as this provided better takeoff performance over the 10 degree flap setting option. Also, in addition to the maximum allowable takeoff weights for both aircraft, runway lengths were also computed for a 75 and 90 percent useful load. This was done because when fully loaded with fuel, the maximum range of the G450 is 4,350 nautical miles and 6,750 nautical miles for the G550. While trips of this length and therefore heavier weights are possible, it is not anticipated to be the regular configuration of these aircraft, especially on the hottest days. To bring the maximum range of these aircraft into perspective, a flight from Flagler to the west coast of the U.S. is about 2,000 nautical miles, while both Western Europe and the central portion of South America are approximately 4,000 nautical miles away.

As recommended in the FAA guidance, the use of payload-range charts helps to determine an aircraft’s takeoff weight when the maximum range is not required. Since these charts were not available for either critical aircraft, the different useful loads were calculated by taking the basic or empty operating weight (which only includes crew and required minimum equipment) and adding 75 or 90 percent of the remaining weight allowed for useable fuel, passengers, and payload. These weight calculations are appropriate since specific fuel reserves and other operating limitations are not typically taken into consideration for planning purposes. The resulting runway lengths were then increased to account for the effective runway gradient. As recommended by the FAA, final lengths were then rounded to the next 100-foot interval if the length calculated included 30 feet or more.

For landing length requirements, charts using 39 degrees of flaps were utilized for the G450 and G550 since this setting results in the shortest landing distance for both aircraft. Also in both instances, the maximum landing weight was used to determine the initial length requirement. These values were then increased 15 percent to account for landing on wet or slippery runways, since the average annual rainfall is 49 inches, most of which occurs during the hottest times of the year. As with the takeoff lengths, these calculations were then rounded to the next 100-foot interval, if the final lengths ended with 30 feet or more. It is worth noting that the landing lengths required for both the G450 and G550 are shorter than many of the much smaller business jets which are just a generation or two older.
TABLE 4-12
RUNWAY LENGTH REQUIRED FOR CRITICAL DESIGN AIRCRAFT

<table>
<thead>
<tr>
<th>Aircraft Operation and Configuration</th>
<th>Gulfstream G450</th>
<th>Gulfstream G550</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takeoff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Allowable Takeoff Weight</td>
<td>7,900’ (74,600 lbs.)</td>
<td>8,100’ (91,000 lbs.)</td>
</tr>
<tr>
<td>90 Percent Useful Load</td>
<td>7,200’ (71,440 lbs.)</td>
<td>7,400’ (86,730 lbs.)</td>
</tr>
<tr>
<td>75 Percent Useful Load</td>
<td>6,200’ (66,700 lbs.)</td>
<td>6,100’ (80,325 lbs.)</td>
</tr>
<tr>
<td>Landing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Landing Weight</td>
<td>4,400’ (66,000 lbs.)</td>
<td>3,700’ (75,300 lbs.)</td>
</tr>
</tbody>
</table>


RECOMMENDED RUNWAY LENGTHS

The current length of Runway 11-29 is 4,999 feet while Runway 06-24 is 5,000 feet. Based on the current mix of aircraft operating at Flagler and those projected in the future, additional runway length, as well as a new parallel runway are needed.

Runway 11-29

The 2005 Airport Master Plan recommended that an ultimate length of 7,000 feet be provided to support the larger aircraft that were just beginning to operate at Flagler during that time. However, the current project to relocate Runway 11-29 to the south by 400 feet will only construct the runway to a length of 5,500 feet. This interim length was based on the runway length analysis conducted as part of the 2009 Near Term Capital Improvements Environmental Assessment (EA). Approval of the Runway 11-29 relocation at 5,500 feet was all that could be justified with the FAA based on the actual critical aircraft activity documented at that time. This included Beechcraft Hawker, Bombardier Learjet, Cessna Citation, and Dassault Falcon series aircraft that were either based at Flagler or operated to and from the airport on a regular basis. It should be noted that the aircraft used in the EA runway length analysis were all within the group of large aircraft up to 60,000 pounds. As such, the results of the EA length analysis were nearly identical to those conducted for this study and shown in Table 4-11. The primary difference was the newer survey used to determine the effective gradient of both runway centerlines as well as some slight variations when interpreting the FAA performance curves.
For the ultimate runway length in the 2005 Master Plan, the recommended 7,000 feet was to accommodate 75 percent of the large aircraft fleet (of 60,000 pounds or less) at a 90 percent useful load. This calculation was generated by the FAA Airport Design program. While this software has since been cancelled, it is interesting to note that the current FAA methodology results in the exact same figure (Table 4-11). Regardless, the actual performance for the current critical aircraft has been evaluated since they have a maximum takeoff weight greater than 60,000 pounds. The resulting calculations in Table 4-12 show the required takeoff length ranges from 6,200 to 7,900 feet for the Gulfstream G450 and 6,100 to 8,100 feet for the Gulfstream G550. These ranges result in averages of 7,050 to 7,100 feet, respectively, which is just over the 7,000 feet previously recommended. Given that both the current and future critical aircraft are representative of the type of aircraft expected to use the runway on a regular basis, the ultimate length of Runway 11-29 should continue to be planned up to 7,000 feet to accommodate these larger and heavier jet aircraft. While each would have varying performance requirements, this ultimate length would also enable Flagler to accommodate similar popular aircraft within this group such as the Airbus Corporate Jet, Boeing Business Jet, Bombardier Global Express, and Dassault Falcon, as well as other Gulfstream models.

Runway 06-24

The existing length of Runway 06-24 is considered adequate for the planning period. At 5,000 feet, this runway is capable of accommodating a majority of the medium to large business jet fleet that have a maximum allowable takeoff weight between 12,500 and 60,000 pounds when the temperatures are not too high. It should be noted that these aircraft can accommodate heavier and more direct crosswinds. As such, their crosswind component for Runway 06-24 is 16 knots. For the same crosswind component, Runway 11-29 provides almost 99 percent of coverage (Table 2-1). Therefore, on days when the temperature and/or aircraft weight are high enough to require more than 5,000 feet, these aircraft would likely be able to use the longer primary runway.

New Parallel Runway

While it is anticipated that a majority of the operations on the new parallel runway would be conducted by small aircraft, the runway would also be used by other aircraft, including jet aircraft greater than 12,500 pounds. For small aircraft a minimum runway length of 4,200 feet was calculated. However, FAA AC 150/5325-4B states that expansion consideration for runways serving small aircraft must be given to accommodate airplanes of more than 12,500 pounds. The FAA guidance states, “Failure to consider this change during an initial development phase may lead to the additional expense of reconstructing or relocating facilities in the future.”

More specifically, since the parallel runway is required for capacity, it must be capable of serving a majority of the aircraft that operate into and out of Flagler on a
regular basis. While this runway does not need to be able to accommodate the largest business jet aircraft under every condition, it does need to be able to accommodate aircraft within the 12,500 and 60,000 pound range, much like Runway 06-24. These aircraft are included in the lists of aircraft which represent 75 and 100 percent of the jet fleet flying in the U.S. As stated in FAA AC 150/5325-4B, the aircraft which make up the remaining 25 percent require a runway length of at least 5,000 feet under standard atmospheric conditions (59°F at sea level). Similarly, if the runway parallel to this new runway (whether Runway 11-29 or 06-24) is unavailable for maintenance or any other reason, the new parallel must be able to accommodate similar traffic. Therefore, a length of 5,000 feet is required for the new parallel runway.

For the RDC, the medium sized Dassault Falcon 900 series of business jets have been selected as the representative critical design aircraft for the new parallel runway. While there are a number of other business jet models with an RDC of B-II using the airfield, the Falcon series has been selected due to its mid-range weight. Many of the Falcon aircraft, including the heavier 900 series, have maximum allowable takeoff weights around 45,500 pounds with a dual wheel landing gear configuration. The table also shows that any taxiways serving the new parallel runway must at least provide the standards of TDG 2 for the Dassault Falcon 900 size aircraft. Taxiways associated with the new parallel runway may require higher design standards depending on the final configuration and how they tie into other portions of the airfield utilized by larger aircraft.

<table>
<thead>
<tr>
<th>Runway Design Code (RDC)</th>
<th>Taxiway Design Group (TDG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Parallel Runway B-II-VIS</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

4.03-3 Runway Width Requirements

Runway width requirements are based on the RDC. A width of 100 feet is required for runways with an RDC of C-II, no matter what category of instrument approach minimums have been established. C-II runways also require a minimum ten foot stabilized shoulder and blast pads at each end, especially when they serve jet aircraft operations. The blast pads need to be paved 120 feet wide and extend 150 feet off each end. The current project to relocate and extend Runway 11-29 to 5,500 feet is being designed with a width of 100 feet as well as the appropriate shoulders and blast pads. When Runway 11-29 is ultimately extended to accommodate C-III aircraft, the width required would remain 100 feet if the critical design aircraft weighs less than 150,000 pounds. However, if the critical design aircraft is heavier than 150,000 pounds (like the BBJ) or if instrument approach minimums to either end of Runway
11-29 become lower than ¾ mile, then the width requirement would increase 150 feet. The possibility for better instrument approaches is discussed in a later section. For now, the ultimate Runway 11-29 alignment needs to be planned at 150 feet wide. For any C-III runway, it is recommended that the required 25 foot shoulders be paved and the blast pad dimensions increase to 200 feet wide and 200 feet long.

For Runway 06-24 the current pavement width and shoulders are adequate throughout the planning period. However, the runway does not have any blast pads. Since this runway is used by jet aircraft on a regular basis, a project to add paved blast pads (120 feet wide by 150 feet long) needs to be conducted.

The future parallel runway requires a width of 75 feet with 10 foot stabilized shoulders. This width would also allow instrument approach procedures with not lower than ¾ mile visibility minimums to be established. While the centerline spacing for this runway would only allow simultaneous VFR operations, the ability to establish instrument approaches to both ends should be considered. This would allow the runway to serve as an alternative instrument runway if the other parallel runway is not available due to maintenance or any other reason. The new parallel will also require 95 foot wide by 150 foot long paved blast pads at each end since it will be used by the small to medium sized jet aircraft operating at Flagler.

4.03-4 Runway Pavement Strength

Pavement strength is predicated upon the critical aircraft’s weight and how that weight is distributed through the landing gear. Currently Runway 11-29 has a published weight bearing capacity of 60,000 pounds for aircraft with single wheel type landing gear. As stated in the inventory, the source of this rating is not known and the current pavement is deteriorating with areas of significant types of cracking as well as raveling and vegetative growth. The 2008 Florida Department of Transportation (FDOT) pavement report recommended that this runway be milled and overlaid immediately. This pavement condition will be resolved when Runway 11-29 is relocated south, as the project also includes reconstructing the existing runway pavement for the future parallel taxiway alignment. While the relocated runway will provide a minimum 91,000 pound rating for dual wheel aircraft (based on the Grumman G550), the ultimate pavement strength will need to support up to 171,000 pound aircraft with the same gear configuration (based on the BBJ).

Runway 06-24 also has an unknown source for the published weight bearing capacity of 60,000 pounds for aircraft with single wheel type landing gear. The runway pavement is considered to be in fair condition and the 2008 FDOT pavement report recommended a microsurfacing in 2012. Given the last improvements to this runway were in 1996 and that the PCI rating is predicted to decrease to poor by 2015, a project to mill and overlay the runway will be required towards the end of the short term planning period. The project will need to provide a minimum 75,000 pound
weight capacity for aircraft with dual wheel type landing gear and should include the addition of blast pads off each end.

For the new parallel runway, the larger B-II jet aircraft expected to use the runway have a maximum allowable takeoff weight approaching 50,000 pounds with a dual wheel gear configuration. This includes the Falcon 900 series aircraft, which is the future critical aircraft for the new runway. Therefore, the runway must provide the pavement structure necessary to support this type of aircraft as well as some of the lighter B-II jets that only have a single wheel gear configuration.

Projects to rehabilitate runway pavements are routinely conducted every 15 to 20 years after the previous major rehabilitation, strengthening, or new construction. These projects, which repair damage to the runway pavement resulting from normal wear, need to be conducted even at airports with regular pavement maintenance programs, including crack sealing and surface seal coats. Recurring projects to maintain general airfield pavements need to be programmed for the planning period. Additionally, the FAA considers the grooving of any runway serving or expected to serve jet aircraft as a high safety priority. Typically this decision is made during initial construction, but depending on the specific pavement conditions or improvement project, may also be considered for existing runway pavements.

4.03-5 Runway Safety Criteria

The primary areas to protect the safety of runway operations include the Runway Safety Area, Runway Object Free Area, Runway Protection Zones, and Obstacle Free Zones. The FAA definitions for these surfaces follow and each of these surfaces, as well as a number of other are depicted on the final Airport Layout Plan (ALP) drawings.

**Runway Safety Area (RSA)** - A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overrun, or veer off the runway. The RSA needs to be: (1) cleared and graded with no potentially hazardous ruts, humps, depressions, or other surface variations; (2) drained by grading or storm sewers to prevent water accumulation; (3) capable, under dry conditions of supporting the occasional passage of aircraft without causing structural damage to the aircraft; and (4) free of objects, except for those that need to be located in the safety area because of their function. It should be noted that the FAA does not allow modifications to any RSA standards.

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

**Runway Protection Zone (RPZ)** – The RPZ is trapezoidal shaped area typically beginning 200 feet from the usable pavement end of a runway. The primary function of this area is to preserve and enhance the protection of people and property on the ground. While there is no vertical component, airports are required to maintain control of each runway’s RPZ. Such control includes keeping the area clear of incompatible objects and activities. While not required, this control is much easier to achieve and maintain through the acquisition of sufficient property interests in the RPZs.

**Obstacle Free Zone (OFZ)** - The OFZ is a three-dimensional volume of airspace centered on the runway that supports the transition of ground to airborne operations (or vice versa). The OFZ clearing standards prohibit taxiing, parked airplanes, and other objects, except frangible navigational aids or fixed-function objects (such as signage), from penetrating this zone. Precision instrument runways also require inner-transitional and precision OFZs. If there is an approach lighting system, then an inner-approach OFZ is also required.

Dimensions of the required RSA, ROFA, RPZ, and OFZ surfaces shown in Table 4-14 are a direct function of the RDC for the specific runway. For all of the surfaces, the width is centered along the runway centerline. For both Runways 11-29 and 06-24, the 1,000 foot RSA and ROFA lengths are for the protection of takeoffs and reflect the space required beyond the departure end of the runway. For landing operations, the RSA and ROFA lengths only need to be 600 feet prior to the threshold. Future RPZ dimensions are based on the recommended improvements to instrument approach minimums addressed in a subsequent section. The specific runway ends to which lower visibility minimums may be established will be determined as part of the airport development alternatives.

Runway 18W-36W was not included in Table 4-14 as the RSA, ROFA, and ROFZ criteria does not apply. In fact, FAA AC 150/5300-13A, Change 1, *Airport Design* references FAA AC 150/5395-1A, *Seaplane Bases* for facilities serving seaplane operations. RPZs off each end of Runway 18W-36W are needed and would begin 200 feet from the designated ends of the sea lane. The existing and future Runway 18W-36W RPZs require an inner width of 250 feet, an outer width of 450 feet, and 1,000 long.
### TABLE 4-14

**EXISTING AND FUTURE RUNWAY SAFETY CRITERIA**

<table>
<thead>
<tr>
<th></th>
<th>Runway Safety Area</th>
<th>Runway Object Free Area</th>
<th>Runway Protection Zone</th>
<th>Runway Obstacle Free Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runway 11-29</td>
<td>400’ wide 1,000’ beyond</td>
<td>800’ wide 1,000’ beyond</td>
<td>500’ x 1,010’ x 1,700’ (both ends)</td>
<td>400’ wide 200’ beyond</td>
</tr>
<tr>
<td>Runway 06-24</td>
<td>400’ wide 1,000’ beyond</td>
<td>800’ wide 1,000’ beyond</td>
<td>500’ x 1,010’ x 1,700’ (both ends)</td>
<td>400’ wide 200’ beyond</td>
</tr>
<tr>
<td>Future</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runway 11-29</td>
<td>500’ wide 1,000’ beyond</td>
<td>800’ wide 1,000’ beyond</td>
<td>1,000’ x 1,510’ x 1,700’ (and)</td>
<td>400’ wide 200’ beyond</td>
</tr>
<tr>
<td>Runway 06-24</td>
<td>400’ wide 1,000’ beyond</td>
<td>800’ wide 1,000’ beyond</td>
<td>500’ x 1,010’ x 1,700’ (both ends)</td>
<td>400’ wide 200’ beyond</td>
</tr>
<tr>
<td>Parallel Runway</td>
<td>150’ wide 300’ beyond</td>
<td>500’ wide 300’ beyond</td>
<td>500’ x 700’ x 1,000’ (both ends)</td>
<td>400’ wide 200’ beyond</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

At the time of this writing, neither Runway 11-29 or Runway 06-24 has compliant RSAs or ROFAs. For Runway 11-29, this was a significant part of the need to relocate the runway 400 feet south. Similarly, the required environmental and design work has been completed for a project to provide standard RSAs and ROFAs off each end of Runway 06-24. The actual construction and wetland mitigation required for the Runway 06-24 improvements is expected to be completed in 2014.

Most of the area encompassed by the existing RPZs off each end of Runways 11-29 and 06-24 are within the limits of airport property. For those areas extending beyond, the land is undeveloped and for some overlaps a pond or Gore Lake. Similarly, portions of the new RPZs associated with the relocated Runway 11-29 project will fall outside of the current airport property line. However, these areas are predominantly undeveloped. Depending on how Runway 11-29 is ultimately extended as well as the types of instrument approach procedures established to each end, the areas within the limits of the RPZs will change and need to be evaluated at that time.

The OFZ for both Runways 11-29 and 06-24 need to be 400 feet wide and extend 200 feet beyond each runway end. As with the RSAs and ROFAs, there are currently some obstructions (mostly vegetation) within these OFZs. These obstructions will be mitigated as part of the projects to relocate Runway 11-29 and improve the safety criteria for Runway 06-24. The base OFZ dimensions for Runway 11-29 will not
change in the future; however, if a precision approach is established with lower than ¾ mile visibility minimums, inner-transitional and precision OFZ surfaces would also be required. The inner-transitional surface criteria would be based on the type of precision approach established and the most demanding wingspan of the aircraft using the runway. The precision OFZ is a defined volume of airspace 800 feet wide and 200 feet from the threshold. Finally, an inner-approach OFZ would be required on those ends with an approach lighting system (ALS) installed. The inner-approach OFZ begins 200 feet from the threshold (end of precision OFZ) and extends 200 feet beyond the last light unit of the ALS. Its width is the same as the OFZ and it rises at a slope of 50 (horizontal) to 1 (vertical) from its beginning.

It should also be noted that an Environmental Assessment would likely need to be conducted prior to the establishment of any precision approach. The study would include determining whether the proper runway safety criteria can be met as well as any potential impacts associated with the required ALS.

4.03-6 Line of Sight Requirements

As part of the design and safety criteria, there are also two critical line of sight requirements that must be considered. The first is commonly referred to as the Runway Visibility Zone (RVZ) which protects the proper light of sight between both existing and future runway configurations at an airport. The RVZ, which is depicted on the ALP drawings, allows aircraft operating on the airfield to verify the location and movements of other aircraft and vehicles on the ground that could create a conflict. This zone is required at Flagler since the ATCT does not operate 24 hours a day. The other line of sight requirement is directly related to the ATCT and the ability for the controllers to have an unobstructed view of all existing and future aircraft movement areas. In addition to other setbacks and imaginary surfaces, the ATCT line of sight is a critical element when considering the location and height of future airport facilities, as well as the location of future aircraft movement areas. All line of sight calculations are based on the established eye height for the ATCT which is 109 feet AMSL.

4.04 TAXIWAY SYSTEM REQUIREMENTS

Taxiway systems include parallel taxiways, entrance/exit taxiways, by-pass taxiways, taxiway run-up areas, hangar taxilanes, and apron taxilanes. The expected movements of the airport’s critical aircraft were utilized to set the minimum taxiway system requirements for Flagler’s primary movement areas. Some of the taxiway standards reflected below are based on the newer TDG while others still remain a function of the critical aircraft’s ADG. The requirements for Runway 18W-36W have been included for any taxiway system that would tie the seaplane facilities off Gore Lake with the rest of the airfield.
### Table 4-15
**Minimum Taxiway System Requirements**

<table>
<thead>
<tr>
<th>Taxiways Serving</th>
<th>Width</th>
<th>Safety Area</th>
<th>Object Free Area</th>
<th>Offset to Runway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway 11-29</td>
<td>50'</td>
<td>118'</td>
<td>186'</td>
<td>400'</td>
</tr>
<tr>
<td>Runway 06-24</td>
<td>50'</td>
<td>118'</td>
<td>186'</td>
<td>300'</td>
</tr>
<tr>
<td>New Parallel Runway</td>
<td>35'</td>
<td>79'</td>
<td>131'</td>
<td>240'</td>
</tr>
<tr>
<td>Runway 18W-36W</td>
<td>25'</td>
<td>49'</td>
<td>89'</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

#### 4.04-1 Taxiway A

The current project to relocate Runway 11-29 includes providing a new full length parallel taxiway on the north side of the runway. Once the relocated runway is opened, this new parallel taxiway will be constructed along the original Runway 11-29 alignment to provide a fully compliant taxiway for all ADG III and TDG 3 aircraft. While the new parallel will serve as the primary taxiway for aircraft movements, most of Taxiway A will remain for access to the various aircraft hangar and parking areas.

As part of the runway relocation project, the portion of Taxiway A that is only 35 feet wide (between Taxiway B and the approach end of Runway 11) will be eliminated and reconfigured at 50 feet wide to tie into the new parallel taxiway. As indicated previously, the portion of Taxiway A between the primary and corporate aircraft parking aprons was rejuvenated towards the end of 2012. This was done to minimize the foreign object debris (FOD) along the taxiway until a full rehabilitation of Taxiway A can be conducted. The eventual project to rehabilitate Taxiway A may not need to include the entire alignment since once Runway 11-29 is relocated, there will be a significant increase in the space to develop the Runway 11-29 flightline. Therefore, at the time of the rehabilitation project some areas served by Taxiway A may change.

#### 4.04-2 Taxiway B

Once construction is complete on the project to relocate Runway 11-29 and provide a new parallel taxiway system, Taxiway B will not be needed. As a dual parallel taxiway, Taxiway B would have more than adequate taxiway to taxiway centerline spacing to provide bypass capability. However, the taxiway would be limited to TDG 2 aircraft or smaller and would only be beneficial when the operational flow was for departures off Runway 11. Given the type and level of aircraft training, this capability (and capacity) would be better served by providing dedicated run-up areas.
on both ends of the new parallel taxiway to Runway 11-29. It is unlikely that any projects to improve or rehabilitate Taxiway B will be required since once Runway 11-29 is relocated, the alignment of this taxiway may be modified for other uses.

### 4.04-3 Taxiway C

As mentioned in the inventory, a project to rehabilitate the deteriorated condition of Taxiway C was programmed for 2007. While this project was never conducted, the design for a new project to rehabilitate the taxiway began in 2012. This project will rehabilitate Taxiway C between Runway 06-24 and Taxiway D. It will also include the removal of the portion between the current Runway 11-29 alignment and Taxiway D as the deteriorated pavement along this section will not be required once Runway 11-29 is relocated. Similarly, as part of the runway relocation project, the portion of Taxiway C between the current Runway 11-29 pavement and Taxiway B will be removed. This section will not be required in the future, plus it creates an undesirable acute angle with the runway alignment.

The abandoned portion of Taxiway C to the south of Runway 06-24 will be used as a connector to the future parallel taxiway on the southeast side of that runway. Therefore, no additional projects to improve or rehabilitate Taxiway C are required.

### 4.04-4 Taxiway D

Because of the right angle it makes with the Runway 11-29 alignment, as well as its midfield location by the primary aircraft parking apron, Taxiway D provides essential access to/from the airfield. However, the portion south of Taxiway E is not necessary especially since it creates an undesirable acute angle with Runway 06-24. As such, this portion will be removed as part of the project to rehabilitate Taxiway C, which also includes improvements to Taxiway D described below.

Between Taxiway A and Taxiway E, the condition of Taxiway D varies from very poor to sections that are completely failing. The design portion of a project to rehabilitate Taxiway D is included with the Taxiway C design beginning in 2013. Construction of the taxiway improvements have been programmed to occur shortly after. Therefore, no additional projects to improve or rehabilitate Taxiway D are required.

### 4.04-5 Taxiway E

A project to extend the northeast end of Taxiway E (by approximately 575 feet) has already been designed and permitted. However, the funding for construction has not been obtained and there has also been some discussion about possibly reconfiguring the area depending on how the east aircraft parking area facilities are ultimately used or expanded. So, the project as originally planned may or may not proceed as designed.
Regardless, the condition of the portion of Taxiway E that serves as the parallel taxiway to Runway 06-24 needs to be addressed. As documented, the pavement between Taxiway A and the threshold to Runway 06 vary with some sections approaching a seriously deteriorated state. While separate from the Taxiways C and D project, the design portion to rehabilitate Taxiway E will also begin in 2013 with construction to start as soon as possible. This project will also include increasing the taxiway width from 35 to 50 feet along the portion between Runway 11-29 and Taxiway A. This is necessary to meet the required design criteria for this as well as the other portions of the taxiway system serving the largest critical aircraft. Therefore, no additional projects to improve or rehabilitate Taxiway E are required.

4.04-6 **Hangar Taxilanes**

Of the six t-hangar taxilanes that tie into Taxiway A, two were constructed in 2012. The other four are considered to be in fair condition and will likely only require minor maintenance such as crack sealing or a surface rejuvenation over the course of the planning period. Additional work will be required for the taxilane which serves the easternmost t-hangar and a clearspan hangar. As noted, this taxilane ties into Taxiway A via a connection to a small apron area that is in very poor condition. A project to connect this taxilane directly to Taxiway A would resolve the problem of aircraft using the deteriorated pavement, as well as potentially providing a few additional aircraft parking positions in this area.

4.04-7 **New Taxiways and Taxilanes**

For the most part, Flagler is sufficiently served by the current parallel taxiway systems to each runway. While the alignment of Taxiway A does bisect the aircraft parking aprons and hangars, this will be resolved with the new parallel of the runway relocation project. Both parallel taxiways would also benefit from the addition of run-up areas as described in the next section. Regardless, one or more new parallel taxiway systems will be required during the planning period to provide the proper access to future airfield facilities. In addition, full length parallel taxiways are also required for any runways with instrument approach procedures with vertical guidance (precision) and non-precision approaches with visibility minimums lower than 1 mile.

A new parallel will be required on the southeast side of Runway 06-24 to support the construction of facilities on this side of the runway. Since the new south access road was completed near the end of 2012, the airport has received a number of inquiries about developing aviation facilities in the southeast portion of the airport. At minimum, an initial portion of the parallel taxiway will need to be constructed in the near future. This parallel taxiway will require a minimum 300 foot centerline separation with Runway 06-24 and be constructed to a width of 50 feet to support the movement of TDG 3 aircraft to and from this side of the airfield.
A parallel taxiway will also be required for the future parallel runway. Depending on the ultimate airfield configuration, the new parallel runway may require two parallel taxiway systems to provide proper airfield access. If the parallel taxiway only serves aircraft using the new parallel runway, then the centerline separation between the runway and taxiway needs to be at least 240 feet. Width of the parallel taxiway would only need to be 35 feet for TDG 2 aircraft. However, depending on the configuration, it is possible that the width would have to be 50 feet if it will be used by the larger TDG 3 aircraft. Likewise, if any taxiway is located between the new parallel runway and an existing runway, the taxiway centerline spacing to the existing runways must also be maintained. With the parallel runway centerlines spaced at 700 feet, there will be plenty of space to provide the 400 foot or 300 foot centerline separations required for the existing runways. This will be evaluated further in the airport alternatives chapter, especially as it relates to future development areas.

Various taxilanes will be required to access future airfield facilities as they are developed. The final configuration will be dependent upon the ultimate hangar sites and aircraft parking apron areas while the taxilane widths will depend on the intended use by different aircraft. The layouts of these additional taxiways and taxilanes will be depicted on the final ALP drawings.

### 4.04-8 Run-Up Areas

The FAA recommends providing holding bays or run-up areas when runway operations reach a level of 30 operations per hour. The peak activity forecasts showed that Flagler conducted up to 78 operations during the peak hour in 2012, primarily due to the level of flight training activity. Because of this, run-up areas would improve the sequencing of aircraft departures since they provide space for holding aircraft, for whatever reason, to delay their entrance onto the runway, while allowing other aircraft to bypass. Designated run-up areas for each runway end should be planned and/or included as part of the parallel taxiway systems described above. An important consideration is to insure that the run-up areas are designed for the proper aircraft with clearly marked entrance and exit centerlines, to ensure wingtip clearance.

As with the runway pavements, projects to rehabilitate the taxiways are routinely conducted every 15 to 20 years after the previous major rehabilitation, strengthening, or new construction. Therefore, depending on the timing of the various taxiway improvements described in the sections above, some projects to maintain the pavements might be needed at the very end of the 20-year planning period.

### 4.05 NEW INSTRUMENT APPROACH PROCEDURES

The inventory described how instrument approach procedures either provide only horizontal guidance to the runway end or both horizontal and vertical guidance. No matter what type, every approach will have a specific height pilots are allowed to
safely descend to and visibility minimums they must stay within when the runway environment is not in sight. Because the heights for any published instrument approach are based on very detailed airspace analyses using FAA Order 8260.3B, *United States Standard for Terminal Instrument Procedures (TERPS)*, the visibility minimums typically determine requirements for new procedures.

Visibility minimums for instrument approach procedures have three general groupings: not lower than one mile, not lower than ¾ mile, and lower than ¼ mile of visibility. Currently all four of the runway ends at Flagler have at least one approach which provides visibility minimums of one mile; with various height limitations. While these provide the airport with the capability to handle aircraft during IFR conditions, they can be limited at times. As documented by the meteorological data collected for this study, Flagler County experiences less than visual conditions 4.5 percent of the time. Given the instrument procedures possible with Global Positioning Satellites (GPS) and the Wide Area Augmentation System (WAAS) technology, improved approach procedures should be planned to as many runway ends as possible.

While instrument procedures are runway end specific, the authorization to establish any new approach begins with an Airport Airspace Analysis. The subsequent approval process of the ALP drawings created as part of this study will include an Airport Airspace Analysis conducted by the FAA to determine the ability of the runways to accommodate the desired instrument approach minimums proposed. To start, this master plan study identifies the various standards required for each specific approach desired to the different runway ends. When the actual instrument procedure is requested by the airport sponsor, all requirements, including the proper environmental review, desired approach minimums, whether circling approach procedures are desired, the survey needed to support the procedure, and the approved ALP must be provided to the FAA. The following sections as well as other sections of this chapter discuss these requirements, which are also reflected on the final ALP drawing set.

### 4.05-1 Precision Approaches

A precision instrument approach is defined as any approach that has visibility minimums lower than ¼ of a mile and the capability of safely guiding aircraft down to heights less than 250 feet above the threshold. A precision approach would greatly enhance the ability of the airfield to accommodate operations during poor weather conditions. However, the setbacks required for such an approach take up a large amount of space on all sides of the runway, especially the approach surface required prior to the precision runway end threshold.

While GPS technology has made precision instrument approaches possible without the need for expensive on-airport equipment, there are still other airfield improvements required to establish the approach. Because of these improvements
and the significant spatial requirements, precision instrument approaches should only be planned to one runway at Flagler. As the longest and primary runway, this would be the relocated Runway 11-29. Whether one or both ends of Runway 11-29 need lower visibility minimums will be established as part of the airport development alternatives.

Any plans for a precision instrument approach will eventually require a Vertically Guided Airport Airspace Analysis Survey, which among other things helps to determine the lowest possible minimums for proposed approaches. Information pertaining to the details of this survey requirement is found in FAA AC 150/5300-18B, General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards. Essentially, this AC provides the specifications for the collection of airport survey data through field and office methodologies in support of aeronautical information and airport engineering surveys. It also explains how to submit data to the FAA, which is ultimately forwarded to the National Geodetic Survey (NGS) for quality control purposes.

Other requirements for establishing precision instrument approaches with less than ¾ statute mile visibility minimums include upgrades in runway lighting, pavement markings, full length parallel taxiway, and an approach lighting system (ALS). Precision approaches also require increases in the various runway safety criteria including the establishment of an inner-approach OFZ, precision OFZ, and full length parallel taxiway. Finally, while precision approaches are not listed as an action normally requiring an Environmental Assessment, the environmental representative from the FAA Orlando ADO should be contacted during the initial stages of establishing the approach to determine the proper environmental review at that time.

4.05-2 Approach Procedures with Vertical Guidance

While two APV procedures have been established at Flagler, the current visibility minimums for each are one and a quarter mile for Runway 11 and one mile for Runway 06. By definition, an APV can be classified as either a precision or non-precision approach, depending on the established visibility minimums. This is because APVs can have visibility minimums as low as ¾ of a mile and the capability of safely guiding aircraft down to heights as low as 250 feet above the threshold. At Flagler, the Runway 11 and Runway 06 approaches are both localizer performance with vertical guidance (LPV), but since their visibility minimums are not lower than one mile, they are considered non-precision.

For these LPV approaches, the addition of an ALS would likely reduce the associated visibility minimums. For Runway 11, there are also a number of obstructions between the final approach fix (5.4 nautical miles west) of the current Runway 11 threshold. The proximity of these to the future relocated Runway 11 threshold will be re-evaluated when the TERPS calculations are conducted to re-establish the approach.
to the new threshold location. If the visibility minimums become less than one mile for either Runway 11 or Runway 06, they would be defined as a precision approach and thus require the much greater runway design standards, setbacks, and other imaginary surfaces.

From an airspace and GPS technology perspective, there are no obvious reasons why APV approaches could not be established to each runway end at Flagler, including the new parallel runway. However, the spatial requirements, other imaginary surfaces, and airfield facilities required to establish either a non-precision or precision version of these approaches will need to be evaluated in the alternatives chapter. As with the precision approaches, any future APV will require a Vertically Guided Airport Airspace Analysis Survey to be conducted based on the requirements of FAA AC 150/5300-18B.

4.05-3 Non-Precision Approaches

There are currently non-precision approaches established to each runway end at Flagler. After Runway 11-29 is relocated and a new parallel constructed, those runway ends with a precision or APV procedure will also have minimums established for non-precision approaches. At a minimum, all of the future runway ends should have at least a non-precision approach with visibility minimums not lower than one mile. For any of these that are new, a Non-Vertically Guided Airport Airspace Analysis Survey based on the requirements of FAA AC 150/5300-18B will need to be conducted. A portion of this survey will determine the lowest minimums possible for the proposed runway end.

4.05-4 FAR Part 77 Imaginary Surfaces

The airspace around airports is protected by the imaginary surfaces defined in Federal Aviation Regulation (FAR) Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace. When combined, the five different imaginary surfaces of this federal regulation protect the ability for aircraft to safely fly into and out of an airport. These surfaces are enforced through local planning and land use jurisdictions to control the type and height of objects in the vicinity of the airport. The specific imaginary surfaces, which must be protected from obstructions, include:

**PRIMARY SURFACE**

A rectangular area symmetrically located about each runway centerline and extending a distance of 200 feet beyond each paved runway threshold. Width of the Primary Surface is based on the type of approach a particular runway has, while the elevation follows, and is the same as that of the runway centerline, along all points. Since all of the paved runways at Flagler will be capable of accommodating aircraft greater than 12,500 pounds, the minimum Primary Surface width is 500 feet. This width will increase to 1,000 feet for the relocated Runway 11-29 once either a precision
approach and/or any non-precision approach with visibility minimums as low as ¾ of a mile has been established.

Under FAR Part 77, water runways are only considered if the designated sea lane (area dedicated for the landing and takeoff run of seaplanes) is outlined by visual markers such as buoys. Currently the corners of Runway 18W-36W are not marked, but should be in the future. Typically FAR Part 77 requires a 250 foot wide Primary Surface for utility runways (propeller driven aircraft under 12,500 pounds) having only visual approaches. However, this width would increase to 500 feet to correspond with the future sea lane corner markers for Runway 18W-36W. The length of the primary surfaces would then be the same as the sea lane (2,875 feet long) since the water runway does not have a prepared hard surface.

**HORIZONTAL SURFACE**

A level oval-shaped area situated 150 feet above the established airport elevation, extending 5,000 or 10,000 feet outward, depending on the runway category and approach procedure available. Since both runways currently have instrument approaches and it is recommended for procedures to be established to the new parallel runway, all of the Horizontal Surfaces at Flagler will have a radius of 10,000 feet.

**CONICAL SURFACE**

Extends outward for a distance of 4,000 feet beginning at the outer edge of the Horizontal Surface, and sloping upward at a ratio of 20:1.

**APPROACH SURFACE**

These surfaces begin at the end of the Primary Surface (200’ beyond paved runway thresholds) and slope upward at a ratio determined by the runway category and type of instrument approach available to the specific runway end. The width and elevation of the inner end conforms to that of the Primary Surface while Approach Surface width and length to the outer end are governed by the runway category and instrument approach procedure available.

For all paved runway ends at Flagler, the current Approach Surfaces extend out 10,000 feet at a slope of 34:1 to an outer width of 3,500 feet. This is based on the non-precision approaches with one mile visibility standards and is what should also be protected for the new parallel runway. If any non-precision approach has visibility minimums as low as ¾ mile, then the outer width would increase to 4,000 feet. For the future relocated Runway 11-29, the Approach Surface to the runway end(s) with a precision approach procedure would extend out 10,000 feet at a slope of 50:1 and then an additional 40,000 feet at a slope of 40:1 to an outer width of 16,000 feet. For both ends of Runway 18W-36W, the Approach Surfaces extend out 5,000 feet at a
slope of 20:1 to an outer width of 1,250 feet (utility runway with only visual approaches)

**TRANSITIONAL SURFACE**

A sloping area beginning at the edges of the Primary and Approach Surfaces and sloping upward and outward at a 7:1 slope.

**4.06 AIRFIELD ENVIRONMENT**

A number of facilities are necessary to support the operations of the airfield environment. Airfield lighting is required for airports intended to be utilized for nighttime operations as well as for operations during less than visual meteorological conditions. These along with pavement markings, signage, and other navigational aids are addressed in the following sections.

**4.06-1 Runway Lighting**

Medium Intensity Runway Lights (MIRLs) are currently installed on both Runway 11-29 and Runway 06-24. MIRLs are required on most runways with non-precision or precision instrument approaches while High Intensity Runway Lights (HIRL) are required for those runways with precision instrument approach capability using Runway Visual Range (RVR) based minimums. Since RVR based minimums are not expected to be a part of any future GPS precision approach at Flagler, the existing MIRLs will support any new precision instrument procedure planned.

However, since all four runway ends have instrument approach procedures, both runways need to include a caution zone. The caution zone is created by changing the white lens on the fixtures within the last 2,000 feet of the runway ends. The lights in this area are replaced with split lens so that they emit yellow light for the last 2,000 feet of usable pavement for the landing rollout. The other half is still white for the approach or takeoff end of the runway.

As documented earlier, both runway lighting systems consist of base mounted light fixtures on cans with conduit. However, the cable for both is directly buried between each light fixture. While direct buried cables save money in the short term, they eventually need to be completely replaced due to the impacts of the environment. The Runway 11-29 fixtures will all be replaced and the cable put in conduit as part of the runway relocation project. Current plans for the project also include replacing the current pilot controlled lighting system for all runway and taxiway lights as the current system has had recurring problems. A separate project will however be required to eventually upgrade the fixtures and cables of the Runway 06-24 MIRL circuit. It is estimated that this project would need to occur by the intermediate planning period. MIRLs will also be a part of the new parallel runway, which should also include caution zones to support the non-precision instrument approaches
planned for each runway end. All of the future runway lighting projects also need to maintain or include eight threshold lights (inboard) to support the instrument approaches.

For all runways, the option of installing light-emitting diode (LED) runway lights should be considered. If LEDs are allowed by the funding agency at that time, then the constant current regulator for each circuit would also have to be replaced. The LED option would make the MIRL circuits much more efficient and sustainable.

### 4.06-2 Taxiway Lighting

Each of the five taxiways is equipped with Medium Intensity Taxiway Lights (MITLs). As documented, all of these systems are in poor condition and most comprise of stake mounted fixtures with the cable buried directly in the ground.

The MITLs on the west end of Taxiway A will be upgraded as part of the widening and connection to the new parallel taxiway system, to include LED fixtures for the lights. Improvements to the MITLs on the east half of the Taxiway A will need to be programmed as a separate project. While this end is in fair condition and the only portion that has base mounted light fixtures on cans with conduit, it will eventually need to be upgraded to include LED fixtures. This may also require a new constant current regulator depending on which circuit the new LEDs on this end of the taxiway are placed on. There are no projects to improve the Taxiway B lights since this taxiway will ultimately be abandoned in the future.

All of the MITLs along Taxiways C, D, and E will be replaced during the first part of the short term planning period. The current design projects for the rehabilitation of these taxiways will include new LED light fixtures on cans with the cable run in conduit. New constant current regulators will also be installed as part of the lighting improvements.

MITLs should also be included as part of any future taxiway projects, including the future parallel and connector taxiways. These systems should also utilize LED fixtures for efficiency and sustainability. Likewise, all future taxiway lighting systems should be of a can and conduit type of installation and will require additional regulators to be added to the airfield electrical vault.

### 4.06-3 Pavement Markings

Airport pavements are marked with painted lines and numbers in order to aid in the identification of the runways from the air and to provide information to the pilot during the approach phase of flight. The FAA classifies three marking schemes depending on the type of runway:
Visual – minimum requirement for landing designator markings and a centerline stripe.

Non-precision – minimum requirement for landing designator markings, a centerline stripe, and threshold markings.

Precision - minimum requirement for landing designator markings, a centerline stripe, threshold markings, aiming point markings, touchdown zone markings, and edge markings.

The non-precision group includes runways with vertical guidance but not lower than \( \frac{3}{4} \) mile visibility minimums. Depending on the type of aircraft activity and physical characteristics of the pavement, additional markings may be required for visual and non-precision runways.

Runway pavement and displaced threshold markings are painted white, while taxiway pavement markings are painted yellow. FAA guidelines state that all taxiways should have centerline markings and runway holding position markings whenever they intersect with a runway. Many surface markings on light-colored pavements require glass beads and need to be outlined in black paint without beads to enhance their conspicuity. This is true for all Portland concrete surfaces and older asphalt concrete pavements. In as little as two years, many asphalt concrete (new or treated) can become ‘light-colored pavements,’ especially in Florida. Therefore, glass beads and black outlines should be considered for most every future pavement marking, but may depend given the slight differences that currently exist between FAA and FDOT requirements.

**RUNWAYS**

Currently both Runway 11-29 and Runway 06-24 have the proper markings for the non-precision requirement, plus aiming point markers and edge markings. Only the addition of touchdown zone markings would be required for Runway 11-29 to have the proper precision runway markings. Once the new parallel runway is constructed, all four ends of the parallel system will need to include the proper character below the landing designator to indicate if a runway end is “Left” or “Right.” Additionally, when blast pads are constructed for the three runways, each will need to be marked with the proper configuration of yellow chevrons.

Since Runway 11-29 will be relocated, all of the markings would be new and any additions made at that time. For Runway 06-24, the recent remarking in 2010 was done in anticipation of the project to relocate Runway 11-29 to keep the proper order of precedence for the markings. This however could change depending on the ultimate configuration with respect to the new parallel runway, which may require changes to the markings for Runway 06-24. For the new parallel itself, it will require non-precision markings plus the addition of aiming point markings since it will be
greater than 4,200 feet and an instrument runway. Edge markings are also recommended if the full pavement width is not available for use as a runway. This would be the case if the shoulders for the new parallel runway are paved rather than just stabilized.

Once redone, runway markings typically last for ten years; however, there are a number of variables that could significantly shorten that period. Therefore, periodic remarking will be required.

TAXIWAYS AND TAXILANES

With the current instrument approaches and RDC designation of C-II, any taxiway serving Runway 11-29 or Runway 06-24 requires the holding position markings to be offset 250 feet, perpendicular to the runway centerline. Currently all of the holding position markings for those taxiways connecting to Runway 06-24 are in the proper location. For Runway 11-29, the holding position markings are only at 200 feet, most likely due to the other non-standard conditions on this runway. The parallel taxiway associated with the relocated Runway 11-29 will have all holding position markings offset at 250 feet.

The current offsets for Runway 06-24 also meet the future requirement and therefore would be required for future taxiways connecting to this runway. For any taxiway that would connect to the new parallel, the runway holding position markings only need to be offset at 200 feet for the non-precision approaches, as well as the visual approaches, envisioned for this runway.

All of the taxiways at Flagler currently have enhanced taxiway centerline markings, prior to the holding position markers. While not required for Flagler, such markings are highly recommended for the ability to enhance situational awareness and minimize the potential for runway incursions. What is required by the FAA is that if enhanced centerline markings are used, that they are applied to all taxiways for consistency of the airfield markings. Therefore, enhanced centerline markings prior to the holding position markers need to be included as part of any future taxiways connecting directly to a runway.

Clearly the various taxiways will be remarked as each is rehabilitated in the near future. The one exception is Taxiway B, which may be abandoned but was just remarked in 2010. For those being remarked, centerline stripes are required, but the inclusion of edge markings will only be required in those areas of large pavement to differentiate the limits of the taxiway surface. While there are a few places like this for Taxiways C, D, and E, many will not be required in the future as the Runway 11-29 relocation and different taxiway improvement projects will remove much of the old abandoned pavement areas. Any new taxiways, taxilanes, and aprons should also at a minimum have the appropriate centerline and holding position markings required.
by the FAA. And as with the runway pavements, periodic remarking will be required at least once during the course of the planning period.

4.06-4 Airfield Signage

Currently there are a number of illuminated signs installed as part of the various runway and taxiway lighting circuits. However all are in relatively poor condition and need to be replaced with new internally illuminated units. For the most part, this will be achieved as part of the runway relocation and various taxiway rehabilitations projects underway. What is critical is the need to develop a complete re-designation plan for the taxiway nomenclature. This is being included as part of the runway relocation design in order to comply with the most recent standards of FAA Engineering Brief No. 89, Taxiway Nomenclature Convention. However, recommendations from this study will be included in the Runway 11-29 relocation design since the ultimate airfield configuration with the new parallel runway may impact decisions on the taxiway designations.

In the future, the inclusion of lighted airfield signage is required for any future taxiway in order to maintain the efficient and safe movement of aircraft to and from the runway environment. As projected in the activity forecasts, the increase in operations will include an increase in itinerant traffic, which increases the number of pilots not familiar with the Flagler County Airport.

Runway distance remaining signs should be considered as part of the project that ultimately extends Runway 11-29. These signs are located along the side of the runway to provide pilots with a quick reference on the length available for takeoff or landing operations. While preferred on the left side of the runway, the most economical option is to utilize double-faced signs on one side of the runway. Under this option, the signs should be placed to the left side of the runway end used most often.

4.06-5 Takeoff and Landing Aids

Over the course of the planning period, new takeoff and landing aids will need to be installed as well as some existing equipment replaced. The following sections describe these systems.

PRECISION APPROACH LIGHTING SYSTEMS

As part of the establishment of a precision approach to Runway 11-29, an ALS will be required. A Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) is required for precision approaches which have decision heights as low as 200 feet and visibility minimums less than ¾ of a mile. The MALSR has light stations positioned symmetrically every 200 feet from the runway threshold out along the extended centerline for an overall distance of
2,400 feet. In addition to threshold lights, 5-unit light bars, and sequencing flashing lights, the MALSR also has a decision bar at 1,000 feet (three 5-unit light bars) from the runway threshold to serve as a visible horizon to ease the transition from instrument flight to visual flight.

A MALSR system should be planned for the end or ends the relocated Runway 11-29 as the height minimums associated with this runway are not expected to be below 200 feet above the threshold. The establishment of this ALS will also require an inner-transitional and precision OFZ surface to each runway end(s) as specified in the section on runway safety criteria.

There are also Omnidirectional Approach Lighting Systems (ODALS) which is one of the recommended ALS for non-precision approaches with not lower than one mile visibility minimums. ODALS are also less expensive than other recommended ALS. Therefore, ODALS should be considered for any runway end with a non-precision instrument approach to potentially achieve lower visibility minimums.

**RUNWAY END IDENTIFICATION LIGHTS**

Runway End Identification Lights (REIL) consist of a pair of synchronized white flashing lights which are situated on each side and abeam of the runway end threshold lights. They provide pilots with a rapid and positive visual identification of the approach end of the runway during night, instrument, and marginal weather conditions. REILs also aid in identification of the runway end in areas having a high concentration of lighting or areas that lack contrast with the surrounding terrain.

Unidirectional REIL systems have the beam axis orientated 15 degrees outward from a line parallel to the runway edge and inclined at an angle of 10 degrees upward, facing the approaching aircraft. Unidirectional REILs should be included to any runway end that does not have an approach lighting system, including the initial relocated ends of Runway 11-29. REILs will also be required for Runway 06 as any approach lighting system to this runway end would extend into Gore Lake and impact the water runway.

**VISUAL GLIDE SLOPE INDICATORS**

Visual descent information is currently only provided to pilots at Flagler using the 2-light unit Precision Approach Path Indicator (PAPI) systems on the Runway 11 and Runway 24 ends. As described previously these systems are in poor condition and those installed for Runways 29 and 06 have been taken out of service. Additionally, 4-light unit PAPI systems are required for any runway which supports jet operations and as such, have been included in the relocation project for Runway 11-29. A separate project is required to install new 4-light units to each end of Runway 06-24. The new parallel runway should also include 4-light PAPIs since it will accommodate jet operations.
WIND INDICATORS

The primary windsock is internally illuminated and part of the airport’s segmented circle. While in good condition, this windsock and the panels which make up the segmented circle will need to be relocated due to its location and the fact that the airfield configuration is changing. The unlit supplemental windsock to the left of the Runway 06 end also needs to be relocated as it is in the ROFA. A project to relocate these facilities as well as to provide additional lighted supplemental windsocks needs to be programmed.

The primary and supplemental windsocks must remain out of the RSA, ROFA, and OFZ for any runway. It is possible for some of the panels of the segmented circle to be within the ROFA if they remain flat and do not protrude above the adjacent RSA edge elevation. For supplemental windsocks, the preferred location is within 1,000 feet of the landing threshold and on the left side of the runway. Over the course of the planning period, only the periodic replacement of the actual windsock, light, and the repainting of the segmented circle panels will be required.

COMPASS CALIBRATION PAD

The current compass calibration pad south of Runway 11-29 will be removed when the runway is relocated. If a new compass calibration pad is created, the new site will need to ensure the facility is outside all of the critical airport design surfaces to protect the safe movement of aircraft. Some of the siting requirements include locating the center of the pad at least 600 feet from magnetic objects, 300 feet from buildings, and 150 from airfield lighting, signage, drainage grates, etc. as they may contain magnetic materials. The final location should then be evaluated by a magnetic survey to determine if there are any locally generated or natural magnetic anomalies of the site.

4.07 AIRPORT FACILITIES

The following sections address the various airport facilities required to support the expected activity. These include the requirements for general aviation terminal space, hangar facilities, aircraft parking aprons, aviation fuel storage, and other support facilities.

4.07-1 General Aviation Terminal Space Requirements

A general aviation terminal provides space for offices, waiting areas, flight planning, concessions, storage, and other amenities for pilots and passengers. General aviation terminals also provide the first and last impression of the airport and local area that pilots and passengers experience. The inventory identified that current space for the general aviation terminal was 2,400 square feet. This area includes space for airport administration, two storage areas, the fixed base operator (FBO) counter area, a
hallway with two vending machines, and restrooms. The little remaining space comprises of a single area left to accommodate two tables with chairs, a small seating area, and two computers for weather/flight planning.

Additional space as well as the ability to segregate the different uses is needed now. This additional space will also depend on how and where future airfield facilities are constructed. The visibility and access to the services described above are essential. Therefore, future airfield improvements and the developable space available will have a significant influence on location of the additional terminal space, while activity levels will dictate the need for that space.

An estimate of the number of pilots and passengers during the peak hour is necessary to determine the amount of space required for general aviation terminal facilities period. The following methodology and assumption were used to compute the figures shown in Table 4-16.

- The number of operations conducted during the peak hour of the average day during the peak month was calculated in the forecast chapter. This accounts for arriving, departing, local, or itinerate users, all of which could utilize the terminal at the same time.

- The number of peak hour operations was reduced by 40 percent to eliminate most of the activity attributed to touch and go operations. It was estimated in the operational characteristics of the capacity assessment that 52.5 percent of the operations are touch and go. While training operations require some terminal space (flight planning, meeting with flight instructor, restrooms, etc.), a majority of these touch and go operations at Flagler do not use the terminal.

- The adjusted peak hour operations (arriving or departing) were estimated to have an average of 2.5 people on board (pilots and passengers).

- Typically an area of 50 square feet is used for each peak hour pilot/passenger to determine the terminal space requirements. However, this value has been doubled to 100 square feet since the current and future terminal will also need to accommodate the County’s staff for airport administration, all typical functions of a full service general aviation terminal, and the ability to provide additional space for other aviation uses.
TABLE 4-16
GENERAL AVIATION TERMINAL AND AIRPORT ADMINISTRATION SPACE

<table>
<thead>
<tr>
<th></th>
<th>Peak Hour Operations</th>
<th>Adjusted Operations</th>
<th>Number of People</th>
<th>Minimum Space (SF*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>78</td>
<td>47</td>
<td>117</td>
<td>11,700</td>
</tr>
<tr>
<td>Forecast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>94</td>
<td>56</td>
<td>141</td>
<td>14,100</td>
</tr>
<tr>
<td>2023</td>
<td>103</td>
<td>62</td>
<td>155</td>
<td>15,500</td>
</tr>
<tr>
<td>2033</td>
<td>125</td>
<td>75</td>
<td>188</td>
<td>18,800</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.
*Square Feet

Since the current general aviation terminal only provides 2,400 square feet of space and it is utilized for the public as well as airport administration, a larger facility is required as soon as possible. In the future, additional space will be necessary especially as the demand for aviation and FBO services expands to the future flightline along the southeast side of Runway 06-24.

4.07-2 Aircraft Hangar Requirements

Hangars are one of the most desirable means for aircraft storage at any airport when offered at reasonable rates. Most hangar space is primarily utilized by the aircraft based at the airfield with only a small percentage used by itinerant traffic (usually for maintenance or occasional overnights). At Flagler the two basic hangar types are t-hangars and private clearspan hangars. T-hangars are fully enclosed buildings which have individual stalls, each capable of storing one aircraft, typically a single-engine or a light multi-engine aircraft. The private clearspan hangars are capable of holding multiple aircraft and most have an attached office, shop, or storage space.

In January of 2013, 89 percent or 70 of the 79 based aircraft were stored in hangars at Flagler. If additional facilities are constructed, it is expected that this high percentage of based aircraft stored in hangars will continue throughout the planning period. This is supported by the fact that the airport still had 37 people on the hangar waiting list after filling the 20 new t-hangars at the end of 2012. Therefore, if the same percentage from January 2013 is applied to the based aircraft forecast, 64 new hangar spaces (134 total), will be required by the end of the planning period.

Of the current 70 based aircraft stored in hangars, 53 are stored in the t-hangars and 17 in clearspan hangars. It is expected that of the 64 new hangar spaces required, approximately 30 would desire t-hangar space. This is assumed using the forecasted mix of based aircraft which projects just a little more than half of the additional 72 based aircraft projected by 2033 will be single-engine or multi-engine aircraft. The
rest are jet and rotorcraft, both of which are almost always stored in hangars at their home airport, but cannot utilize t-hangars.

While the t-hangar figure is pretty straightforward, the number of aircraft stored in clearspan hangars varies depending on size and who owns the hangar. Some clearspan hangars may house a multitude of aircraft if operated by an aviation business such as a maintenance facility or flight school. Conversely, it is possible for some private or corporate clearspan hangars to store only one or two aircraft. At minimum, a sufficient mix of large and small clearspan hangars should be planned to accommodate the 34 additional aircraft projected to be stored in this type of facility.

For reasons stated above, a number of hangar facilities, exceeding the minimum identified, will be reflected on the final ALP drawing set. This provides flexibility for the County when moving forward with the development of any hangar facilities. Ultimately, each will be based on the availability of funds, demand at that time, and the business decisions of the tenants using these facilities.

4.07-3 Aircraft Parking Apron Requirements

Currently 11 percent or nine of the 79 based aircraft are parked outside. For planning purposes, based and itinerant aircraft apron requirements are usually considered separately since they serve different functions. Because parking areas typically accommodate both itinerant and based aircraft, the two will be analyzed independently and then combined.

Aircraft parking areas are also typically divided between small and large aircraft following the weight characteristics. Therefore, small aircraft spaces typically have tie-down capability which are sized to accommodate single-engine and light multi-engine aircraft. Large aircraft apron space includes the area necessary to park the bigger turboprop multi-engine and business jet aircraft. Formulas to estimate the apron space required for based and itinerant aircraft parking are provided in the following sections.

METHODOLOGY FOR BASED AIRCRAFT PARKING AREA

A minimum area of 300 square yards should be applied to each single-engine and light multi-engine based aircraft expected to be parked on an apron. For planning purposes, this value should be increased by ten percent for expansion over the following two year period. The result using this methodology is that 2,970 square yards of apron space is required for the nine based aircraft currently stored outside.

As stated in the previous section, it is assumed that the same percentage of the based aircraft parking demand will be met through the use of hangar facilities by the end of the planning period. Therefore, of the 151 based aircraft projected by 2033, only 11 percent or 17 total based aircraft will need apron space. It was also assumed that
these additional aircraft stored outside will be small aircraft. This results in a total of 5,610 square yards of apron space for based aircraft in the future.

**METHODOLOGY FOR ITINERANT AIRCRAFT PARKING AREA**

Itinerant apron space is intended for relatively short-term parking periods, usually less than 24 hours (possibly overnight), as they are primarily for transient aircraft. When possible, such aprons should also be located as to provide easy access to the general aviation terminal, aviation fuel services, and ground transportation facilities. For planning purposes, a preferred approach is to calculate the total number of peak day itinerant aircraft that can be expected on the apron at any given time.

For Flagler this was calculated using the peak activity, local versus itinerant and operational fleet mix figures from the approved aviation activity forecasts. Once calculated, a minimum area of 360 square yards per itinerant aircraft was applied for each small aircraft, while 1,000 square yards was applied for the large aircraft. This is considered reasonable since the current and future critical aircraft require between 1,200 and 1,500 square yards. Regardless, this methodology resulted in 22,240 square yards of itinerant apron space required in 2012 and 47,360 square yards by 2033.

Combined, it was calculated that a minimum total of 25,210 square yards or 226,890 square feet of aircraft parking apron is needed now and 52,970 square yards or 476,730 square feet in the future. The inventory documented that there is approximately 249,525 square feet of space from the three paved apron areas. This amount was reduced from the calculated needs in order to estimate the additional aircraft parking apron space required by the end of the planning period. It is worth noting that the current available apron space could be reduced to 200,025 square feet as the entire east aircraft parking apron is currently available for private lease.

Options to provide the additional apron space for the planning period, which includes expanding into new areas of the airport property, will be addressed in the airport alternatives chapter. Because this methodology is based on minimum requirements and the current FAA guidance states that apron area will vary from airport to airport, the ALP will depict more future paved apron space than the calculated need over the planning period. Many of these apron improvements will depend on the availability of funds, demand at that time, or even the business decisions of the tenants expected to utilize the facilities.
# TABLE 4-17
## AIRCRAFT PARKING APRON REQUIREMENTS

<table>
<thead>
<tr>
<th></th>
<th>2012*</th>
<th>2033</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Based Aircraft</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Aircraft on Apron</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Area Required for Based Aircraft (subtotal)</td>
<td>2,970 SY</td>
<td>5,610 SY</td>
</tr>
<tr>
<td><strong>Itinerant Aircraft</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Aircraft on Peak Day</td>
<td>34</td>
<td>51</td>
</tr>
<tr>
<td>Area Required for Small Aircraft</td>
<td>12,240 SY</td>
<td>18,360 SY</td>
</tr>
<tr>
<td>Large Aircraft on Peak Day</td>
<td>10</td>
<td>29</td>
</tr>
<tr>
<td>Area Required for Large Aircraft</td>
<td>10,000 SY</td>
<td>29,000 SY</td>
</tr>
<tr>
<td>Area Required for Itinerant Aircraft (subtotal)</td>
<td>22,240 SY</td>
<td>47,360 SY</td>
</tr>
<tr>
<td><strong>Apron Space Requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Area for Based and Itinerant Aircraft</td>
<td>25,210 SY</td>
<td>52,970 SY</td>
</tr>
<tr>
<td>(226,890 SF)</td>
<td>(476,730 SF)</td>
<td></td>
</tr>
<tr>
<td>Apron Area Available in 2012</td>
<td>249,525 SF</td>
<td>249,525 SF</td>
</tr>
<tr>
<td>Surplus (+) / Deficit (-)</td>
<td>+22,635 SF</td>
<td>-227,205 SF</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

*Based aircraft using January 2013 information.
SF: Square Feet
SY: Square Yard

The primary and corporate aircraft parking aprons should not require any rehabilitation over the course of the 20-year planning period as they were just reconstructed/constructed at the end of 2012. The east aircraft parking apron will require rehabilitation towards the end of the long term planning period.

A number of floodlights have been installed around the airport facilities. For the airside facilities these primarily consist of floodlight fixtures mounted to the sides of the buildings. The installation of apron floodlighting is recommended as it provides additional safety for night operations and security for parking. Floodlighting should be considered for future apron projects.

## 4.07-4 Aviation Fuel Supply and Service

The current 12,000 gallon 100LL Avgas and Jet A tanks provide sufficient volume for the quantity sold without needing excessive deliveries to replenish the on-hand
supply. However, as operations increase and additional portions of the airport are developed, additional capacity and even a second fuel tank site may be required. Due to their age, the current fuel tanks will need to be replaced in the near future with the ability to provide the additional storage as well as space to park the airport’s fuel trucks. Consideration will also need to be given to the potential of relocating the current facilities to a more centralized location (including the self-service pump) given the pending relocation of Runway 11-29.

Eventually a second site may be required to support the development and related aircraft activity on the southeast side of Runway 06-24. While the County’s fuel trucks are currently used to dispense fuel to different airport locations, they do not and should not do so across the active runways. Therefore, either an interior access road could be developed for the fuel trucks or additional trucks could be stationed at a second fuel facility on the southeast side. If a second facility is developed, the inclusion of a 100LL self-service pump should also be considered.

4.07-5 Electrical Vault

The current airfield electrical vault structure is in good condition and could be retrofitted to house the additional equipment envisioned for the airfield lighting and electronic navigational aids proposed over the 20-year planning period. However, all of the electrical home runs are located under the taxiways and aircraft parking areas north of Runway 11-29. As such additional home runs will also need to be placed beneath the existing and any future general aviation terminal area facilities. When this is considered with the fact that the current vault is in a remote location with respect to the ultimate airfield configuration, a new vault site should be planned.

4.07-6 Aircraft Rescue and Fire Fighting

Aircraft Rescue and Fire Fighting (ARFF) services are dictated by the type and level of operations conducted. The FAA uses an index based on the longest commercial service aircraft conducting five or more daily departures. Since Flagler does not have any airline, regional/commuter, or charter aircraft that conduct five or more daily departures, the airport is not required to have on-site ARFF facilities.

If this should change in the future, then the minimum ARFF equipment (extinguishing agents and vehicles) would be defined at that time based on the requirements of the FAR Part 139 airport certification process. For now, fire and rescue services provided by the on-airport Flagler County Emergency Services station meet the airport’s needs.

4.07-7 Heliports

The non-standard helicopter operations area located on the closed portion of Taxiway B, between Taxiway A1 and Taxiway D needs to be modified to provide the
appropriate setbacks and markings of public use heliport. Relocation of the facility should also be considered since it is currently in an area that will be reconfigured once Runway 11-29 is relocated.

Requirements for the future heliport are based on the criteria contained in FAA AC 150/5390-2C, *Heliport Design*. For planning purposes, the Eurocopter AS350B was selected as it has similar characteristic to other popular rotorcraft. This includes the McDonnell Douglas MD500 and Bell 206 JetRangers; however the AS350B is slightly more demanding with respect to rotor diameter and overall length. It is also the same model that Flagler County currently operates for its firefighting operations based out of the private heliport. Planning a heliport to the requirements of this midsize group of rotorcraft will also provide more than adequate space for a number of the smaller, piston rotorcraft which are very popular for training. These include the Schweitzer 300s and Robinson rotorcraft (R22 and R44 models).

**SAFETY CRITERIA AND SURFACE CHARACTERISTICS**

The Eurocopter AS350B requires the following areas:

**Touchdown and Lift-off Area (TLOF)** = 36 feet (1 times the rotor diameter of the critical rotorcraft). The AS350B has a rotor diameter of 35.1 feet. The entire TLOF should be load bearing for the design helicopter. Portland Cement Concrete (PCC) is recommended for ground level facilities. Asphalt surfaces are less desirable as they may rut under the skids or wheels of a parked helicopter.

**Final Approach and Takeoff Area (FATO)** = 64 feet (1.5 times the overall length of the critical rotorcraft). In this case the AS350B has an overall length of 42.5 feet. The area between the TLOF and FATO should be capable of supporting the static loads of the design helicopter. If the FATO is load bearing, the portion abutting the TLOF should be continuous with the TLOF and the adjoining edges should be at the same elevation. If it is unpaved, the FATO should be prepared to prevent loose stones and any other flying debris caused by rotorwash.

**Safety Area** = 20 feet beyond the FATO. The Safety Area needs to be clear of all objects except any frangible objects that must be located within due to their function. The Safety Area does not need to be load bearing and in fact, can extend over water (such as a drainage area). If the Safety Area is load bearing, the portion abutting the FATO should be continuous with the FATO and the adjoining edges at the same elevation. If unpaved, the Safety Area should be prepared to prevent loose stones and any other flying debris caused by rotorwash.
SEPARATION REQUIREMENTS

To avoid limiting other airfield operations, the heliport Safety Area cannot overlap any surface which protects the movement of aircraft in other areas (such as a Taxiway Object Free Area). FAA AC 150/5390-2C states the TLOF and FATO areas are closed to other craft if a helicopter or other mobile objects (dollies, tug, automobile, etc.) are within the FATO, TLOF, or Safety Area.

VFR APPROACH/DEPARTURE SURFACES

At least one VFR Approach/Departure Surface must be established to the heliport. The surface starts at the edge of the FATO and slopes out and upward at an 8:1 ratio for a distance of 4,000 feet horizontal. At the outer limit, the surface is at a height of 500 feet above the established elevation of the TLOF and has a width of 500 feet.

Transitional surfaces also extend out from the edges of the FATO for a distance of 250 feet to each side of the FATO from the approach/departure surface centerline. The side transitional surfaces slope out and upward at a 2:1 ratio and are not applied to the FATO edge opposite of the approach/departure path.

Curved VFR approach/departure paths are also allowed. FAA AC 150/5390-2C provides the criteria necessary to construct such corridors.

PROTECTION ZONE

There is also a protection zone which starts at the FATO and extends out 280 feet beneath the 8:1 approach/departure surface. The size and shape of the protection zone matches the 8:1 approach/departure surface and has no set elevation. Potential sites to establish a public use heliport will be evaluated in the airport alternatives using the criteria above.

IDENTIFICATION MARKING AND LIGHTING

The public heliport should have the standard white “H” marking in the center of the TLOF, oriented in the direction of the preferred approach/departure path. The height of the “H” should be at least 12.75 feet (0.3 times the overall length of the critical rotorcraft, which is 42.5 feet for the AS350B). For night operations the perimeter of the TLOF area should also include flush, omnidirectional green lights. In addition to the four corners, each side should include an additional light located in between the corner fixtures. The lights need to be located within one foot inside or outside the TLOF perimeter.

4.07-8 Seaplane Facilities

Activity on Runway 18W-36W is somewhat limited by the height of trees along the shorelines off each end of the 2,875 foot sea lane. As indicated previously, the four
corners of the sea lane (and therefore Primary Surface) need to be marked using buoys. This would then enable the trees obstructing the associated 20:1 Approach Surfaces to be identified and removed.

The current seaplane facilities are limited to a small dock and ramp located on the eastern shore of Gore Lake, both of which are substandard and in poor condition. Improvements to these public facilities should be made in the near future to support the existing seaplane operations. Additionally, the development alternatives will explore the possibility of expanding the current facilities and providing a link to the airfield facilities. Public access to the site will also need to be established.

4.08 LANDSIDE ACCESS, AUTOMOBILE PARKING, AND UTILITY INFRASTRUCTURE

An integral yet often overlooked aspect of an airport’s operation is that which is not related to aircraft or air travel. The landside facilities such as local street access, airport circulation roads, automobile parking, and utilities are equally critical to development. Likewise, the airside components addressed previously are dependent upon the availability of the proper landside features. The following sections address these elements.

4.08-1 Landside Access

On the north side of the airport, landside access is provided directly off SR 100 via Airport Road or Aviation Drive. Old Moody Boulevard provides access to those facilities west of Airport Road. Given the current airport property boundary and therefore development space, the current access is sufficient. Even as facilities are reconfigured or expanded after the relocation of Runway 11-29, most landside access will consist of ensuring facilities maintain the adequately sized connections to the existing roads. Any development along the Runway 11-29 flightline must also ensure the airfield access by the different fire and rescue service vehicles remains as direct and unobstructed as possible. Finally, the ability for fuel tanker trucks to make deliveries must be maintained, especially if the fuel storage tanks are reconfigured or relocated.

Direct landside access to the south side of the airport was made in late 2012 when the new road was completed. In addition to opening up the Runway 06-24 flightline for aviation and non-aviation development, the road also provided better access to the ATCT. Given the boundary of the current space available for development, access to most future facilities will come directly off the new south access road. Exceptions would be the seaplane facilities and any facilities constructed to the south and southwest of the Runway 06 threshold. Development in these areas would require a short road to tie into the new south access road. Alternatives to provide this automobile access are considered in the following chapter.
4.08-2 Automobile Parking

At many general aviation airports, a number of automobiles are parked in the hangar facilities while the aircraft are in use. In some cases, vehicles are left on the aircraft parking apron during a flight or trip. Flagler County has worked to eliminate this practice as it only increases the number of automobiles on the airside of the airport and therefore the risk of an incident between an aircraft and a vehicle. In fact, with the exception of the original three rows of t-hangars, all hangars and buildings have dedicated automobile parking on the landside of the facilities. Options to provide automobile parking for the original three rows of t-hangars should be explored. For any future facilities an adequate amount of landside space needs to be included for automobile parking.

4.08-3 Utility Infrastructure

The ability to provide the utilities (electric, water, and wastewater service) to future facilities is an important consideration since the associated costs can be a significant portion of the overall development. Even areas only expected to support aircraft hangars require utilities. For example, if no water or wastewater services are provided, than the hangar cannot obtain a certificate of occupancy and/or fire flow requirements may not be met. This limits the use and therefore the types of tenants that may lease the facilities. Nearly every company and many private entities require adequate utilities to conduct various activities in their facilities. Without, the buildings would be limited to the storage of aircraft and even then, only if the appropriate fire codes are satisfied. Therefore, extending the appropriate utilities for future facilities should be included as part of the project providing the landside access into any parcel or new development area.

4.09 WILDLIFE HAZARD SITE VISITS AND ASSESSMENTS

The FAA has had a wildlife hazard management program in place for more than 50 years. This program focuses on mitigating wildlife hazards on or near airports through habitat modification, harassment technology, and research. The program continues to evolve and includes a number of advisory circulars, best management practices, and resources to assist airports. This includes updates to the primary advisory circulars addressing wildlife hazards, which were updated and re-issued as drafts in December of 2012.

The FAA has continued to modify the wildlife hazard requirements for non-certified (non-FAR Part 139) airports like Flagler that accept federal grants. At question is whether the airport would have to perform the Wildlife Hazard Site Visit (WHSV) or Wildlife Hazard Assessment (WHA). The WHSV is typically conducted over a period of one to three days to identify any immediate hazards and for the FAA to determine whether the more comprehensive WHA is necessary. The WHA is
typically conducted over a 12 month period and may result in the need for a Wildlife Hazard Management Plan if any mitigation is required for the hazards identified.

On December 10, 2012 the FAA published the “Clarification of Wildlife Hazard Management Requirements for Non-Certified Federally Obligated Airports” in the Federal Register. Public comments were due on January 9, 2013 but at the time of this writing, the final notice in the Federal Register had not been published. The proposed clarification defines four categories of non-certified airports. Flagler falls into the first category for airports “…with 100 or more based turbine-powered aircraft or 75,000 or more annual operations.” The FAA requires that these airports conduct a WHA within three years of receiving a federal development grant after the final Federal Register notice is published. Flagler will then have to update the WHA at least once every 10 years after.

Even though the final notice has not been published, a WHA should be programmed to be completed by 2016 and a 10-year update by 2026.

4.10 MASTER STORMWATER MANAGEMENT PLAN

Currently development at Flagler County is done on a permit-by-permit basis with respect to the stormwater requirements of the St. Johns River Water Management District. During the short term planning period, the 1996 Master Stormwater Management Plan for the airport should be updated given the required improvements identified in this master plan. This update would evaluate all past permits, the existing impervious surfaces, the current airfield environment (including existing drainage features, basins, soil types, etc.), and the future impervious areas envisioned for development. Combined these elements would create a conceptual drainage permit for the entire airport development program, which would help the County to streamline the permitting process of the individual projects as they are designed.

4.11 POLLUTION PREVENTION PLANS

The U.S. Environmental Protection Agency (EPA) developed a program under the Clean Water Act to regulate certain high priority stormwater sources. As such, discharges of stormwater from industrial facilities (which includes most airports) must be covered by a National Pollutant Discharge Elimination System (NPDES) permit. Even if there is no active construction, an airport which discharges stormwater to navigable waters of the U.S., waters of the contiguous zone, or the ocean triggers the need for a NPDES Stormwater Multi-Sector General Permit for Industrial Activities.

A requirement of the NPDES permit is to have a Stormwater Pollution Prevention Plan (SWPPP). A SWPPP is applicable to the standard operations of an airport, as well as for individual construction projects. In addition, a Spill Prevention, Control, and Countermeasure (SPCC) plan may need to be included in the SWPPP. As
opposed to a SWPPP, which is a tool used to prevent spills, a SPCC plan addresses what to do if a spill occurs.

While the requirement for an overall airport SWPPP can be accommodated by individual project permits, the development of such a plan is a proactive step for the County to consider. In addition to helping manage the activities of the various facilities at the airport, a SWPPP will also facilitate obtaining NPDES construction permits for future development projects. The SPCC plan is required if more than 1,320 gallons (cumulative for all airport facilities) or more of oil of any kind or in any form (including, but not limited to petroleum, fuel oil, sludge, and oil refuse) is stored above ground.

4.12 LAND ACQUISITION

Whenever possible, the option to acquire additional property for aviation related development and to ensure future land use compatibility must be considered by the County. Even though there are options to develop the current airport property, the potential for non-compatible development around the airport will always exist. In short, as development pressure builds in the areas surrounding the airport, the window of opportunity for the County to acquire any additional land at a reasonable cost diminishes. For these reasons, consideration must be given to the identification of a future property envelope that the airport should secure to address demand and development needs beyond the master planning horizon.

If possible, it is recommended that sufficient property interests be obtained for all RPZs of the airport. At a minimum, the County should obtain control of the property within the future RPZs as this is a specific requirement set forth in FAA AC 150/5300-13A, Change 1. If the County cannot purchase the property within the areas of the future RPZs, then it must ensure the proper land use controls or agreements such as avigation easements are in place to prevent any incompatible land uses. The amount of land or options that should be considered will primarily be based on the selected airport alternatives.

Considerations should also be given to incorporate the right of way for the portion of the south access road between Belle Terre Boulevard and the Iroquois Canal. Currently the approximate 3.5 acres of this 80 foot right of way are owned by Flagler County, but not included in the airport’s property line. Finally, an area of approximately 5 acres has been identified to the northeast of where Aviation Drive turns east. This land would significantly improve the landside access and/or automobile parking required for the both existing and future tenants along the north flightline.
4.13 SUMMARY OF FACILITY REQUIREMENTS

Table 4-18 provides a general summary of the facility requirements that were determined necessary to satisfy the approved aviation demand forecasts. Essentially, this table includes the minimum improvements required over the 20-year planning period. Some additional facilities will also be planned and included as part of the final ALP drawing set and Capital Improvement Program to enhance the airport. The order in which these improvements are listed does not have any relation to the priority or phasing of such projects.
### TABLE 4-18
SUMMARY OF FACILITY REQUIREMENTS

<table>
<thead>
<tr>
<th>Category</th>
<th>Required Improvements</th>
</tr>
</thead>
</table>
| **Runways**       | Environmental Assessment for New Parallel Runway  
New Parallel Runway to 5,000 feet with MIRLs  
Environmental Assessment for Extension of Runway 11-29  
Extend Runway 11-29 up to 7,000 feet with MIRLs  
Rehabilitate Runway 06-24 Pavement Surface and Add Blast Pads  
Periodic Runway Pavement Maintenance  
Mark Corners (with buoys) and Clear Approaches for Runway 18W-36W | |
| **Taxiways**      | Rehabilitate Taxiway A and T-hangar Taxilanes  
Parallel Taxiway on Southeast Side of Runway 06-24 with LED MITLs  
Parallel Taxiway to New Parallel Runway with LED MITLs  
Taxiway/Taxilane Access to New Facilities  
Aircraft Run-up Areas  
Periodic Taxiway Pavement Maintenance | |
| **Airfield**      | Environmental Assessment for Runway 11-29 Precision Approach  
Conduct Vertically Guided Airport Airspace Analysis Survey  
Replace MIRLs on Runway 06-24  
Replace MITLs on Taxiway A with LED Fixtures  
Periodic Remarkering of All Airfield Pavements  
Replace Illuminated Airfield Signage  
Distance Remaining Signs on ultimate Runway 11-29  
MALSR for Precision Approach to Runway 11-29  
ODALS for Non-Precision Approaches  
Unidirectional REILs (runway ends without ODALS)  
PAPI 4-light Systems (all runway ends)  
Relocate Primary Windsock and Segmented Circle  
Install Lighted Supplemental Windsocks (all runway ends) | |
| **Airport Facilities** | Additional General Aviation Terminal and Airport Administration Space  
T-hangar Units (at least 30)  
Clearspan Hangar Space (for at least 34 aircraft)  
Additional Aircraft Parking Apron Space (at least 227,205 SF)  
Rehabilitate East Aircraft Parking Apron  
Second Aviation Fuel Storage Area (100LL Avgas and Jet A)  
Improve, Expand, or Relocate Electrical Vault  
Lighted Public Heliport  
Improve Seaplane Facilities | |
| **Other Facilities** | Automobile Parking Area for T-Hangar Units  
Landside Access and Parking to New Development Areas  
Extension of Utilities to Future Development Areas  
Wildlife Hazard Assessment  
Update Airport Master Stormwater Management Plan  
Miscellaneous Land Acquisitions | |

Source: C&S Engineers, Inc.
CHAPTER 5 - ALTERNATIVES FOR AIRPORT DEVELOPMENT

This chapter evaluates potential improvements to provide the facility requirements identified for the Flagler County Airport over the 20-year planning period. While a number of projects to maintain and improve the airport will be conducted in the future, only the most significant are presented in this chapter. These improvements, which have the most potential to impact existing facilities, the environment, or surrounding community, include:

- Primary Instrument Runway
- New Parallel Runway
- Taxiways and Run-up Areas
- Airport Facilities
- Non-Aviation Related Development

The primary intent of the alternatives analysis is to evaluate the viability of meeting the identified needs and how best to undertake the selected improvements. As such the evaluations include factors related to the operational effects, potential environmental impacts, cost considerations, and implementation issues. While there are inherent difficulties in expressing certain factors in comparable terms, at minimum, each development option must meet the applicable Federal Aviation Administration (FAA) and Florida Department of Transportation (FDOT) standards for safety.

5.01 PRIMARY INSTRUMENT RUNWAY

An ultimate length of up to 7,000 feet was recommended in the facility requirements chapter for Runway 11-29 based on the aircraft over 60,000 pounds that use the airfield. While this group of aircraft does not currently conduct 500 annual operations, the ability for the primary runway to accommodate this group in the future must be preserved. The facility requirements also identified the need to establish a precision instrument approach; however, due to the significant setbacks required, only one will be established to the primary runway. The following sections describe the most critical issues related to planning the ultimate layout of Runway 11-29.

5.01-1 Change in Guidance for Runway Protection Zones

In September 2012, the FAA issued the *Interim Guidance on Land Uses Within a Runway Protection Zone*. Under this new guidance, certain land uses within the limits of a new or modified Runway Protection Zone (RPZ) will need to be coordinated and a determination made by the FAA as to whether or not the land use is compatible. The previous master plans for Flagler included extending Runway 11-29...
such that the future RPZs would extend well beyond the airport property boundary. These proposed RPZs encompassed existing buildings, public roads, and above ground utilities; any one of which would trigger the need for a detailed evaluation under the new FAA guidance.

Historically, these plans only included the need to acquire land for the ultimate Runway Safety Area (RSA), Runway Object Free Area (ROFA), and the Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) for the precision approach. If justified and no other alternative existed; these previous plans would likely have to consider the following under the new criteria:

- acquisition of a much larger land area off each end of the runway;
- relocation of a portion of Belle Terre Boulevard;
- relocation of a portion of Seminole Woods Parkway; and
- placing a portion of the overhead power transmission lines (that are east of and parallel to Seminole Woods Parkway) underground.

Any one of these items would have a negative impact on the benefit cost analysis (BCA) required by the FAA for any project where the total costs would exceed $10 million in requested discretionary funds. Therefore, the previous plan for the ultimate configuration of Runway 11-29 has been reconfigured to avoid creating such incompatible components that would make the project unrealistic.

### 5.01-2 Runway End Siting

While there are many design elements to consider when establishing the future ends of a runway, only the most significant are included in this section. For a new or relocated runway, the approach and departure thresholds should be collocated with the physical runway ends. This is especially important at general aviation airports where most users are not familiar with the use of declared distances. As such, the required airport design approach and departure surfaces to these thresholds are a major consideration in determining the runway ends. It should be noted that the approach surfaces for this purpose are those defined in FAA Advisory Circular (AC) 150/5300-13A, Change 1, *Airport Design* which are not the same as those defined in Federal Aviation Regulation (FAR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. Regardless, these surfaces (which are categorized by a Runway Type number) still need to be clear of obstacles and due to their size, extend well beyond the limits of the airport property boundary. Conversely, for any runway improvements, both the RSA and ROFA must be on airport property in order to provide the proper safety for aircraft operations.

As mentioned previously, the current project to relocate Runway 11-29 to the south by 400 feet will only be constructed to an initial runway length of 5,500 feet. Both ends of this relocated runway will have the approach and departure thresholds
collocated with the end of the useable runway pavement. The required RSA and ROFA, as well as the RPZ off the west end of the runway will be within airport property. A portion of the east end RPZ will extend beyond the current airport property boundary; however, as shown in Figure 5-1 the off-airport portion would only overlap vacant, undeveloped land.

In order to reconfigure the ultimate length of Runway 11-29, the ends were sited given the fact that a future precision approach could only realistically be established to Runway 11. An additional objective was to ensure that no future extension(s) of Runway 11-29 would create any incompatible uses. As detailed in the following sections, these priorities limit the ability to provide a 7,000 foot runway along the 11-29 alignment at Flagler.

**FUTURE PRECISION INSTRUMENT APPROACH**

The historic weather data collected from Daytona Beach International shows that during actual instrument meteorological conditions, Runway 29 is favored slightly more than Runway 11 or either end of Runway 06-24. However, there are significant constraints to establishing a precision approach to Runway 29. When looking at the initial 5,500 foot relocated runway alignment, a precision approach RPZ to the Runway 29 threshold would encompass at least six existing homes and ten undeveloped residential lots of the Seminole Woods subdivision. Clearly then if Runway 11-29 were extended any distance further east; the number of homes and lots impacted would increase and likely need to be acquired under the current FAA Interim Guidance on Land Uses Within a Runway Protection Zone. A comprehensive review process would also have to be conducted in order to determine whether or not Seminole Woods Parkway, Utica Path, or Ulturn Trail (all public roads) could remain within the limits of the future precision RPZ or if these roads would have to be relocated.

The overhead power transmission lines running parallel to Seminole Woods Parkway on the east side of the road would also be impacted. The transmission lines are supported by a group of five towers; four of which have been surveyed around 81 feet above mean sea level (AMSL) and the fifth at 88 feet AMSL. While there are certainly a number of trees within the future approach path that would be taller than these structures, some power poles (and perhaps even the lines) might penetrate the required 34:1 airport design approach surface (Runway Type 8) of the initial relocated Runway 29 threshold and would certainly impact any future extension east. Impacts to the surfaces of the initial relocated Runway 29 threshold will depend on the final runway end elevation. As such, these power lines create a limitation to establishing a future precision approach in that any future Runway 29 threshold would have to be displaced or a significant cost incurred to place a portion of the power lines underground.
Another limitation and cost consideration is the requirement for a MALSR as part of the establishment of a precision approach to Runway 29. The MALSR light lane begins 2,400 feet prior to the landing threshold and includes an inner approach Obstacle Free Zone (OFZ). This surface is 400 feet wide and would continue to a point 200 feet beyond the MALSR light fixture furthest from the runway threshold. The land required for the MALSR system as well as the inner approach OFZ would need to be acquired. While not shown on Figure 5-1, this land acquisition would extend beyond Seminole Woods Parkway if a precision approach were established to either the initial 5,500 foot Runway 29 threshold or any ultimate extension east.

In the simplest terms, a precision instrument approach to Runway 29 is not feasible since the impacts and costs would not be justified in either the required environmental review or probable BCA associated with the project. Therefore, a future precision approach with visibility minimums lower than ¾ of a mile and the capability of safely guiding aircraft down to heights less than 250 feet above the threshold will continue to be planned to Runway 11 (Runway Type 8). For Runway 29 a future straight-in, non-precision approach is planned with not lower than one mile visibility minimums (Runway Type 5).

**INSTRUMENT DEPARTURE SURFACES**

Currently all four runways are used for instrument departures; however, only Runway 29 and Runway 24 have specific procedures published. Regardless, the basic requirement for any runway used for instrument departures is to have a 40:1 departure surface (starting at the established departure or stop end of the runway) which is free of obstacles. At many airports, obstacles typically penetrate the departure surface. This is the case at Flagler, where each departure surface has some penetrations due to trees. These are considered minor obstacles and only prevent aircraft departing Runway 29 or Runway 24 under instrument conditions from turning outbound or onto course until they have reached a minimum altitude. For Runway 29 departures this altitude is 1,700 feet AMSL and for Runway 24 departures, aircraft may turn to whatever course approved after climbing through 700 feet AMSL.

In the future, the instrument departure procedures for Runway 11-29 should be re-established as part of the runway relocation. For both the initial and future departure ends of the future runway alignment, none of the departure surfaces would have any significant obstacles beyond those already created by trees today. The only exception would be for the departure surfaces to the east, which would also have some penetrations due to the overhead power lines east of Seminole Woods Parkway. However, these penetrations are only expected to result in minor departure procedure penalties, similar to those already in place today. Once a precision instrument approach is established to Runway 11, the clearing required would likely eliminate any obstacle associated with instrument departures in the opposite direction off Runway 29.
5.01-3 Ultimate Length of Runway 11-29

For the west end, minimizing the potential for incompatible land uses included ensuring the RPZ and MALSR associated with the future precision approach to Runway 11 did not extend beyond Belle Terre Boulevard. As described before, the acquisition of this additional land would diminish the financial justification of the project. There would also be the possibility that Belle Terre Boulevard would have to be relocated out of most, if not all of the RPZ to meet the new compatibility guidance.

However, given the distance between Belle Terre Boulevard and the location of the initial relocated Runway 11 threshold, an additional 450 foot extension could be accomplished to the west (see Figure 5-1). While the required RSA and ROFA for this ultimate 450 foot extension west would be on airport property, it would still have the potential to impact existing features. These include the numerous wetland areas, perhaps portions of the abandoned landfill, and existing airfield drainage pipes, which run perpendicular to the runway centerline in this area.

On the east end, it would be possible for another 550 foot extension to be realized; however, the FAA would have to agree that the overlap of the ultimate RPZ with Seminole Woods Parkway is not considered an incompatible land use. Figure 5-1 illustrates that only a small part of the central portion of the RPZ (which is the most critical) would extend beyond the public road.

Combined, these two extensions could provide an ultimate length of 6,500 feet for Runway 11-29. Any additional length beyond 6,500 would increase the cost of the project to a point that it would likely not be feasible. This of course will depend on the actual runway length required in the future, which may or may not be up to 7,000 feet as calculated based on the current aircraft performance information. If more than 6,500 feet of runway is required in the future, other runway centerline locations and/or orientations may need to be considered to avoid extending Runway 11-29 and its required surfaces into the surrounding community.

5.01-4 Land Acquisition Considerations

No land is required for the initial relocation of Runway 11-29 to a length of 5,500 feet. However, some additional land will be required off each runway end in order to accommodate the two ultimate runway extensions described above. These areas as well as additional land immediately adjacent to them are described in the following paragraphs and included as part of the new Airport Property Map presented in the following chapter.

On the west end, just under nine acres would be required to properly accommodate the ultimate MALSR and associated OFZ. This area largely includes the drainage pond located between the current airport property line and Belle Terre Boulevard. Another five acre parcel in the southwest corner of the ultimate RPZ would also be
required since the existing structures in this area would not be compatible with the future precision RPZ. In addition to these two areas, the airport should consider acquiring the remaining areas within the future precision RPZ and as much of the remaining undeveloped land north to the intersection of SR 100 and Belle Terre Boulevard. At a minimum, approximately 29 acres will be required on this end.

For the east side, approximately two acres would be required to fully accommodate the ultimate RSA and ROFA associated with the 550 foot extension. In addition, the airport should consider acquiring all of the land west of Seminole Woods Parkway that would lie within the ultimate RPZ, to include three of the five commercial lots that have been previously platted, but remain undeveloped. Additional undeveloped land in this area should also be considered as it would square off the sections described above, accommodate future approach lighting systems, and provide the potential to ultimately connect the new south access road with Seminole Woods Parkway (described in a later section). Combined, this area would represent approximately 56 acres.

5.02 NEW PARALLEL RUNWAY

Development of a new parallel runway is a significant undertaking as it must take a number of factors, both on and off the airfield, into consideration. Additionally, the parallel runway alternative needs to be firmly established since it will have a substantial effect on the location of other airport facilities. The following sections describe how the different parallel runway options were developed and then evaluated to derive the selected alternative.

5.02-1 Factors Effecting Development Options

In developing the initial parallel runway options, a number of factors were taken into consideration. Combined, these help to frame the opportunities that exist to meet the competing needs for the new runway and other airport facilities.

PARALLEL RUNWAY HISTORY AT FLAGLER

The analysis of a new parallel runway for the Flagler County Airport is not a new concept. The long term need for a parallel runway was identified and evaluated as part of the 1997 Airport Master Plan. In fact, the 1997 study estimated that a parallel runway would be needed between 2010 and 2015 for capacity. This effort culminated in the inclusion of a parallel runway for the long range development schedule and on the Airport Layout Plan (ALP) at that time. It is interesting to note how the long range timing of the 1997 Airport Master Plan lines up with the current capacity need, despite the fact that particular study did not have the benefit of actual airport traffic control tower (ATCT) counts.
Plans to construct a future parallel runway at Flagler were not included in the 2005 Airport Master Plan Update and therefore are not reflected on the current ALP. While the 2005 study recognized the operational limitations of the airfield, it was decided that no capacity improvements would be included in the plan. The alternatives chapter of the 2005 Airport Master Plan Update states, “This constraint was considered as part of the planning process and it was determined that the operational activity would maximize itself and that the Airport would not pursue additional capacity enhancement projects such as parallel runways.” This is no longer the case given the actual operations conducted and the current leadership of Flagler County.

**BASIC DESIGN STANDARDS**

While documented in the previous chapter, there are some essential requirements of the new parallel runway that must be kept in mind when evaluating the initial options and final alternatives. Perhaps the most important is that the new parallel runway is required for overall airport capacity. Table 4-4 illustrates that by the end of the planning period, the airport capacity will be exceeded if no improvements are made. Given the current and expected fleet mix, this additional capacity is required for all aircraft types, not just for the flight training conducted at Flagler. Therefore, the new parallel runway cannot be limited to small aircraft only. Following this requirement, the FAA accepted runway length analysis showed that the new parallel runway would require a minimum length of 5,000 feet. Essentially, this would allow most of the jet aircraft currently operating and expected to operate into Flagler to utilize the parallel runway during times of peak activity.

The parallel runway must also have a minimum runway centerline to runway centerline spacing of 700 feet. This separation allows for operations under visual flight rules (VFR) to be conducted simultaneously on the parallel runways. Similarly, while simultaneous instrument operations are not planned or required, the new parallel runway should have the capability for establishing instrument approach procedures to both runway ends. This instrument capability would be limited to those approaches with not lower than one mile visibility minimums. As such, each option will also need the ability to provide the standard RSA, ROFA, and RPZ for aircraft with a Runway Design Code (RDC) of B-II, as well as to accommodate the setbacks required for a future precision approach to the primary runway.

**CONFIGURATION OF RUNWAYS**

It is entirely possible for the new parallel runway to be orientated to either the current Runway 11-29 or Runway 06-24 alignment. This is due to the wind coverage analysis, interviews with ATCT management, and the projected growth in activity. Previously Table 2-1 showed that Runway 06-24 is required to provide the recommended 95 percent crosswind coverage for the 10.5 knot category. In general, Runway 06-24 provides slightly better crosswind coverage than the primary runway.
for the smaller aircraft. However, this is not the case all year, with the summer months providing the best example when daily sea breezes favor Runway 11-29. For most conditions, operational flow is determined by the ATCT controllers. Their decisions are based on factors such as the number or type of aircraft in the pattern, the predominant arrival/departure points to/from the airfield, and the time of year. Interviews with ATCT management indicated that a parallel runway to either of the existing runways at Flagler would provide the needed capacity. Also, a key consideration is the growth projected over the 20-year planning period, of which nearly half is expected to be from additional jet aircraft activity.

As described in the capacity section, offsets to the parallel runway thresholds should be considered if they can help minimize any potential environmental impacts. Operationally, offset thresholds are only significant when simultaneous instrument approach and departure procedures are required, which is not the case for Flagler. However, depending on the final runway and taxiway configuration, they might be considered to avoid creating any new “hot spots” on the airfield. It should be remembered that the “hot spot” between the current Runway 29 and Runway 24 thresholds was one of the reasons behind the project to relocate Runway 11-29.

5.02-2  Initial Parallel Runway Options

Initial options for the new parallel runway were made to reflect the required airport design standards and runway end sitting criteria of FAA Advisory Circular (AC) 150/5300-13A, Change 1, Airport Design. These options were based on four groups:

- Group 1 – South of Relocated Runway 11-29
- Group 2 – Southeast of Runway 06-24
- Group 3 – Northwest of Runway 06-24
- Group 4 – Current Runway 11-29 Alignment

Each initial option also included a basic taxiway system to illustrate how the proposed parallel runway could tie into the existing and future airfield facilities.

When comparing these initial options, it was quickly discovered that additional operational fleet mix and environmental data would be required. Since this level of detail was not included in the master plan, a separate study to fully define and analyzed the parallel runway was funded. Because the initial options and analyses of this master plan were adopted into this parallel runway study; they were subsequently removed from this chapter to avoid repetition or confusion. The separate parallel runway study is included in its entirety as Appendix B – Project Definition Study for Potential New Parallel Runway.
5.02-3 Selected Parallel Runway Alternative

As documented in Appendix B, the future parallel runway centerline will be oriented 700 feet south of the relocated Runway 11-29 centerline with the east thresholds (or Runway 29 ends) aligned. This configuration, shown in Figure 5-2, meets all of the facility requirements and creates the least impacts to the environment and surrounding community. It will therefore be utilized in the evaluation of all other potential airport improvements and included as part of the new ALP drawing set presented in the following chapter. With this alignment, the primary instrument runway will become Runway 11L-29R and the new parallel Runway 11R-29L.

5.03 TAXIWAYS AND RUN-UP AREAS

While some taxiways and run-up areas have been included in the previous primary instrument and new parallel runway discussions, this section addresses the options associated with the ultimate configuration of the airfield facilities.

5.03-1 Parallel Taxiway Systems

The project to relocate Runway 11-29 will create a full length parallel taxiway offset 400 feet to the north by utilizing a portion of the current Runway 11-29 pavement. As shown in Figures 5-1 and 5-2, this taxiway would be extended with each ultimate end of Runway 11L-29R. For any taxiway system south of the relocated runway, the future parallel runway configuration must be considered. The study which defined the new parallel runway project (Appendix B) initially included a full length parallel taxiway between the two runways; however it was removed in the refined alternatives. In its place two partial parallel taxiways were offset to the south as it was determined these would provide the access needed when the parallel runway is constructed. The partial parallels will also promote better separation of traffic and eliminate the possibility of pilots confusing a full parallel taxiway in-between as one of the parallel runways.

In the parallel runway study, the partial parallel taxiways on the south side would connect the future Runway 11R threshold with Taxiway D and the future Runway 29L threshold with Taxiway H. What the parallel runway study did not address is that the portion of Taxiway C between the new parallel runway and Taxiway E should be closed when the new parallel runway is built. This would eliminate the acute angle Taxiway C makes with the parallel runway, while still providing the access required to support the ground movements anticipated. However, ultimately a full length parallel taxiway should be planned on the south side of the new parallel runway (Runway 11R-29L). This would provide unrestricted access along Runway 11R-29L for any aircraft arriving to or originating from the south side of the airfield. Depending on traffic levels when the parallel runway is built, it may be necessary to construct more of this full parallel taxiway system than what was originally proposed in the study defining the parallel runway project.
Once traffic levels reach those projected towards the end of the planning period, a partial taxiway system between the two parallel runways would facilitate the safe ground movement of aircraft. This partial taxiway would provide access to the future Runway 11R threshold from the north flightline by connecting with Taxiway D, between the parallel runways (see **Figure 5-2**). The taxiway, offset 400 feet from the primary instrument runway and 300 feet from the new parallel runway, does not need to connect to the ultimate end of the primary instrument runway. It is assumed that most of the larger aircraft that would justify the ultimate runway length of 6,500 feet would utilize the larger FBO and hangar facilities existing and proposed along the north flightline. Likewise, any that would go to or come from the southeast could utilize Taxiways D or E to access the full length parallel on the north side of the primary runway. No other parallel taxiways are needed between the parallel runways given the existing and planned connectors, including the taxiway that would connect the thresholds on the east ends of the parallel runways.

Currently Runway 06-24 is served by Taxiway E, the full length parallel on the northwest side. However, to provide safe runway access to the future facilities on the southeast side of the airport, a parallel taxiway system is needed on the southeast side of Runway 06-24. The first half of this partial parallel taxiway system, Taxiway H, is under design and should be constructed toward the end of this study. This first portion will connect the Runway 06 threshold to Taxiway C, to include reconstructing the abandoned portion of Taxiway C on the southeast side of the runway.

While Taxiway H only requires a 300 foot centerline offset, it is being designed with an offset of 335 feet. At 335 feet, no future airport development space is lost since the Taxiway Object Free Area (TOFA) for Taxiway H will lie just outside the ROFA for Runway 06-24 and coincide with the Building Restriction Line (described later). Similarly, the future However, the additional offset would significantly improve the ability to provide the proper grading and drainage requirements between the runway and taxiway. In addition, while the 335 foot offset does not allow every large aircraft using the airfield to turn perpendicular to the runway hold line, the largest will be able to make most of the turn, thus improving the aircraft’s visibility to both runway ends. Regardless, the majority of aircraft accessing this side of the airfield will be able to make the full turn before the hold line, including the Dassault Falcon 900 series of business jets, which are the representative critical design aircraft for Runway 06-24.

The second phase of Taxiway H will connect to the partial parallel taxiway on the south side of the new parallel runway. Depending on the level of activity and number of facilities on the southeast side of the airport, this second portion of Taxiway H may be included as part of the parallel runway program. For the long term planning period, the final phase of Taxiway H is planned to continue across the parallel runway system to tie into the Runway 24 threshold. During design, the geometry of the connection between Taxiway H and the Runway 24 threshold will have to be evaluated carefully given the proximity and intersection with the primary runway’s north parallel taxiway. The level of activity and types of aircraft using the airport at
that time may dictate the final layout to avoid creating a “hot spot,” especially as it relates to the additional need for a run-up area at this end of Taxiway H (described below).

5.03-2 Connector/Exit Taxiways

As documented in the airport capacity section, Runway 06-24 will not have the two taxiway exits within the proper range necessary to minimize runway occupancy time. As reflected in Table 4-1, currently Runway 06 only has one exit and Runway 24 will go from two exits to one after the primary runway is relocated. This is because the portion of Taxiway D between Taxiway E and Runway 06-24 will be closed as part of the runway relocation project. Therefore, the only suitable exit for operations in either direction along Runway 06-24 is the connection with Taxiway C.

Different connector taxiway alternatives were considered in order to maximize the exit factor and therefore capacity of Runway 06-24. To improve runway capacity at Flagler, exit taxiways need to be within 2,000 to 4,000 feet from the landing runway threshold. Additionally, eligible connectors within this range need to be separated by at least 750 feet. The ultimate full length parallel taxiway south of the new parallel runway will just fit within these criteria to provide the second connector necessary to maximize the exit factor for Runway 06. For operations in the opposite direction, a new connector needs to be established at a location 770 feet southwest of the existing intersection between the Runway 06-24 and Taxiway C centerlines. A connector at this location will maximize the exit factor for Runway 24 and would tie into the existing intersection between Taxiway E and Taxiway D.

The taxiway exits included in the capacity calculations of the previous chapter did not include the ultimate length of Runway 11L-29R at 6,500 feet or the future parallel runway. For the ultimate 11L threshold, there would still be two exit taxiways within the proper range. However, for the ultimate Runway 29R threshold, only one exit (Taxiway E) would be in the proper range. Therefore, alternatives for an additional connector were considered for landings on the ultimate Runway 29R threshold. The location of this new exit (shown on Figure 5-2) is based on the proper exit criteria as well as the different alternatives considered for facility development north of the primary runway. This was to ensure that the new exit would not create direct access between future aircraft apron areas and the runway. For the parallel runway, the configuration of the future full length parallel taxiway includes connectors in the proper locations to maximize the exit factor required for runway capacity.

5.03-3 Run-up Areas

Since the airport has already exceeded the activity levels when the FAA recommends providing run-up areas, one has been included at every runway end for the ultimate airfield layout. In order to preserve adequate space for the potential run-up areas, each has been configured to provide the proper setbacks so that Airplane Design
Group (ADG) III aircraft can operate unrestricted on the adjacent taxiway. Each has also been sized to allow two to three ADG I aircraft to position outside the ADG III taxiway TOFA during run-up operations.

While it is clearly advantageous for the run-up area to be as close to the departure end of the runway it serves, this is not always the best alternative. For Runway 11L-29R, the ultimate run-up areas have been planned to serve the ends of the runway once it is relocated. These run-up areas would not need to be relocated with the ultimate extensions off each runway end. The additional taxi distances of 450 and 550 feet are not significant enough to justify the costs associated with relocating either of these run-up areas.

For the new parallel runway, both run-up areas would be located off the south parallel taxiway system. For the Runway 29L end, the run-up area is at the end of the parallel taxiway. For the Runway 11R end, the run-up area has been moved approximately 400 feet east to avoid impacts to known wetlands off that end of the parallel taxiway system. A run-up area has not been included as part of the partial taxiway system between the parallel runways.

For Runway 06-24, there are a couple of options to establish run-up areas at each end of Taxiway E. On the Runway 06 end, the standard configuration is not considered the best options given the proximity of known wetlands and the fact that Taxiway E still retains the older military alignment, including the 45 degree bend as the taxiway approaches and connects to the runway threshold. Therefore, given that Taxiway E has a centerline offset of 525 feet with Runway 06-24, the best option for a run-up area at this end is on the inboard side of the taxiway. An inboard run-up area configuration is also considered more advantageous for the Runway 24 end given the existing airport facilities just north of the taxiway as well as the future facilities planned to the northwest of Taxiway E.

For the future parallel Taxiway H, the run-up area serving the Runway 06 end would be standard, but also optional. While this run-up area would certainly be advantageous, the required ATCT line of sight would place additional limitations to the development along the Runway 06-24 flightline. The run-up area shown for the Runway 24 end of Taxiway H would require much different geometry. As indicated earlier, the ultimate configuration of Taxiway H to the end of Runway 24 will need to ensure that it does not create a dangerous intersection with the parallel taxiway one the north side of the primary runway. Similarly, since it is possible that operations on the primary runway may occur when Runway 24 is the active runway; the run-up area must consider the critical surfaces associated with the primary runway as well. For planning purposes, the run-up area to serve the south side of the Runway 24 threshold has the standard outboard configuration, but is located between the primary runway and its north parallel taxiway. As such, the actual area available for run-up operations will also be impacted by the TOFA for the north parallel taxiway.
5.04 AIRPORT FACILITIES

Options for the development of the primary airport facilities are presented below. While the principal goal is to meet the facility requirements identified for the planning period, the improvements described in the following also seek to ensure that the airport’s long term goals are not prohibited by development of facilities which only address short term needs. Each of the different development plans considered include flexibility since it is possible that when the facility improvements actually begin, a different arrangement of the site may prove more advantageous at that time. For this reason, additional space has been provided when possible to allow some rearrangement of facilities to accommodate specific site conditions and/or to reduce development costs at the time of development.

5.04-1 Development Areas

There are three general areas available for the development or in some cases redevelopment of the required airport facilities. Each is described in the following sections and shown as part of Figure 5-3. Due to the potential environmental impacts and associated costs for mitigation, Figure 5-3 also reflects the known wetland areas in the airport vicinity. These wetland areas were field verified and delineated as part of the separate study to fully define and analyzed the parallel runway (see Appendix B – Project Definition Study for Potential New Parallel Runway). While the parallel runway study did not include a jurisdictional determination from the St. Johns River Water Management District (SJRWMD), the wetlands shown were coordinated with SJRWMD for concurrence. Therefore, as with the ultimate airfield development, the various facility alternatives avoid these wetland areas whenever possible.

NORTH SIDE OF AIRPORT

The north side primarily includes the land to the north of Runway 11-29 (future Runway 11L-29R). Once the runway is relocated, this area will have additional space from that which is currently available today. However, while the runway will shift 400 feet south, there will not be an equal amount of developable space created. This is due to the various imaginary surfaces required for the future precision instrument runway and parallel taxiway system that must be protected. Regardless, this area provides development as well as redevelopment opportunities and will also remain the most visible to the community with the best access to Interstate 95.
SOUTHEAST SIDE OF AIRPORT

The southeast side of the airport includes the space south of the future parallel runway (Runway 11R-29L) and east of Runway 06-24. The available space for both aviation and non-aviation development is framed by the airport property line to the east and south. Other features include the Iroquois Canal to the south, two large retention ponds in the southeast corner, and Gore Lake to the west. Landside access is provided by the new south access road which comes into the area from the west off of Belle Terre Boulevard.

WEST SIDE OF AIRPORT

The west side includes all of the airport property south of the future parallel runway (Runway 11R-29L); west of Taxiways C, D, and E; and around the northern half of Gore Lake. This area is only considered for development beyond the 20-year planning horizon. This is due to the significant cost that would be associated with providing the required landside access and utilities to this side of the airfield. As described previously, the establishment of new public roads through a runway’s RPZ is not recommended in the FAA’s current guidance on compatible land uses within RPZs. Therefore, extending an access road south from SR 100 into the west side is not a realistic option. Future access could only be provided by extending a road east from Belle Terre Boulevard. However, as reflected on Figure 5-3, there are a substantial amount of known wetland areas on this side of the airport. It should also be noted that while no wetlands are shown to the northwest of Gore Lake (immediately west of Belle Terre Boulevard), this is only because no specific information or field work was done in this area. It is highly likely that much of this area would include jurisdictional wetlands.

5.04-2 Planning and Design Elements for Alternatives

In addition to remaining clear of the RSA, ROFA, and RPZ associated with the ultimate airfield configuration, there are additional setbacks and design features to consider with each airport facility alternative. The following sections provide an overview of the more critical design elements when evaluating development options.

TAXIWAY CENTERLINE SPACING AND OFFSETS

Previous sections addressed the minimum runway centerline to parallel runway centerline and/or taxiway centerline separations. However, for some facilities there will be a need to consider a taxiway or taxilane that is parallel to another taxiway. For ADG II aircraft, the parallel taxiway centerline to parallel taxiway/taxilane centerline must be 105 feet. This distance increases to 152 feet if one or both of the parallel taxiways would be used by ADG III aircraft. For any layouts where a 180 degree turn might be made from one parallel taxiway onto the other, the centerline
distance would increase to 162 feet to avoid steering angles greater than 50 degrees on aircraft in Taxiway Design Group (TDG) 2 or 3.

In order to minimize the potential for deviation onto an active runway, the FAA advocates that no aircraft parking aprons have taxiways with a direct access to or across a runway. Forcing pilots to consciously make turns in order to get to a runway vastly improves the situational awareness to prevent runway incursions. Therefore, the configuration of any future apron or even hangar taxiway/taxilanes needs to incorporate this design concept. This was taken into consideration when siting the new taxiway exit for landings on the ultimate Runway 29R end.

**BUILDING RESTRICTION LINE**

The overall height of most on-airport structures is limited by the object’s location with respect to the various airspace surfaces required under Federal Aviation Regulation (FAR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. For general aviation airports, a Building Restriction Line (BRL) that delineates where structures around 25 feet tall can be located is useful in facility planning. Typically, the Transitional Surface (described in the previous and following chapters) coming off the sides of a runway determine the location of the BRL, but it can also be influenced by Runway Visibility Zone, TOFA, taxilane object free area, RPZ, critical areas for navigational aids, and other required surfaces. Since only a few of the airside buildings at Flagler are less than 25 feet tall (such as the t-hangars, maintenance shed, and electrical vault), a 25 foot BRL will be utilized.

Because this line primarily correlates to the FAR Part 77 surfaces, for most flightlines it generally follows the Transitional Surface with the same elevation. As the name implies, this would delineate the area where a structure 25 feet above the corresponding runway centerline elevation could be located. However, it would still be possible to plan and construct lower facilities inside the 25 foot BRL, as long as they did not penetrate the corresponding FAR Part 77 or any other imaginary surfaces for the airfield. For Flagler, a 25 foot BRL is also very useful in establishing limits for the large aircraft parking areas as all of the existing and future critical aircraft have tail heights around 25 feet.

**BUILDING SEPARATION**

Guidance on the proper construction and protection of aircraft hangar facilities is provided by the National Fire Protection Association (NFPA) in their document NFPA 409, “Standard on Aircraft Hangars.” The current 2011 version of this document provides the separation required between hangar buildings depending on the type and use of the hangar, as well as building materials. However, it should be noted that this document is due to be updated in 2016, the requirements may vary, and final interpretations are typically made at the local level. Regardless, some hangar separations are up to 75 feet between single hangars or a cluster of small
hangars (like t-hangars) that provide up to 12,000 square feet of space. Since various types and sizes of hangars will be included in the different development alternatives, a minimum separation of 75 feet was considered between all structures.

**WATER MANAGEMENT FEATURES**

As described in the facility requirements, the 1996 Master Stormwater Management Plan for the airport will need to be updated based on the recommendations of this master plan. However, it should be noted that the need for each facility to provide the proper water management criteria has been streamlined. Improvements to and permits for the various on-airport ponds have been obtained for most of the developable airport property. This does not eliminate the need for environmental review or drainage permits; rather most future facilities at the airport would only need to tie into the available drainage infrastructure.

**5.04-3 General Aviation Terminal Sites**

Additional general aviation terminal space and services will be required during the planning period. However, since the current terminal space is basically just an addition to an older clearspan hangar, the facility cannot be expanded to accommodate the identified need. Taking this into consideration, the analysis of sites for the general aviation terminal building focuses on the ability to develop an overall terminal complex with many different facilities. In addition to the terminal building, each site needs to include the necessary airside access, aircraft parking space, hangar facilities, landside access, and automobile parking. The terminal itself would include a multitude of services for pilots and passengers; the airport administration offices and facilities; and other commercial spaces, including the potential for a restaurant. Descriptions of the four potential sites shown on Figure 5-3 are included below.

**GENERAL AVIATION TERMINAL SITE 1**

The first general aviation (GA) site considered was on the east end of the Runway 11-29 flightline. This area has existing landside access via Aviation Drive and could allow the terminal apron area to tie into the existing corporate aircraft parking apron. There is approximately 360 feet of depth or developable space between the 25 foot BRL and Aviation Drive. Since GA Site 1 is across the airfield from the ATCT, there would be no line of sight issues with the facilities or aircraft movement areas.

**GENERAL AVIATION TERMINAL SITE 2**

The next area considered for the terminal complex was along the new flightline to the southeast of Runway 06-24. In fact, since the first airside parcel has been leased (southwest of the Taxiway C connector), there are actually two possibilities for the development of the terminal facilities. GA Site 2 would be to the northeast of the leased parcel between the Taxiway C connector and the new parallel runway system.
This area provides approximately 360 feet of depth or developable space between the 25 foot BRL and the new south access road. However, due to the proximity of the future RVZ and ATCT, the layout of facilities would need to ensure that no structure or parked aircraft would create a line of sight issue with the aircraft movement areas.

**GENERAL AVIATION TERMINAL SITE 3**

The other site along the new Runway 06-24 flightline would be between the first leased parcel (southwest of the Taxiway C connector) and the Runway 06 end. For the most part, GA Site 3 would also have approximately 360 feet of developable space between the 25 foot BRL and the new south access road. As with GA Site 2, facilities in this area would need to ensure that no structure or parked aircraft would create a line of sight issue for the ATCT.

**GENERAL AVIATION TERMINAL SITE 4**

GA Site 4 explores the option of developing new general aviation terminal facilities at the existing terminal site. This site would utilize the existing landside access from either Aviation Drive or Airport Road and is centrally located between the current primary and corporate aircraft parking aprons. There is approximately 600 feet of depth or developable space between the 25 foot BRL and Airport Road. And as with GA Site 1, there would be no line of sight issues with the ATCT for the development of facilities on this side of the airfield.

**COMPARISON OF GENERAL AVIATION TERMINAL SITES**

A general concept of how the future terminal facilities could be configured at the different sites is included in Figure 5-4. For comparison purposes, each includes a 15,500 square foot terminal, two 22,500 clearspan hangars, approximately 200,000 square feet of aircraft parking apron, and the related automobile parking. However, no estimates for the development costs were calculated since such figures can vary significantly and would not indicate the best option for the airport’s overall development. Rather, the sites were evaluated based on a comparison of key qualitative elements described in the sections below. In addition to selecting the best site for the general aviation terminal, the comparison and ranking of these elements also provides valuable information for determining the best utilization of each development area.
Airfield Access

An important element to consider is how each site could tie into the ultimate airfield configuration for aircraft operations. This includes the ability to support the movement and parking requirements of ADG III aircraft. As such, while all of the existing and future taxiways are capable of supporting these aircraft, the two sites north of the airport’s primary instrument runway are more practical with respect to the larger aircraft operations. Regardless, every site considered does provide the ability for more than one taxiway into and out of the terminal aircraft parking area. Such dual access is considered a minimum requirement for any conceptual layout to support activity during peak times as well as the rare occasions when one access point may be temporarily unavailable due to maintenance or some other operational issue.

For every site, the development of the general aviation terminal parking area would be influenced by the timing of the proposed taxiway improvements. On the north side, both GA Sites 1 and 4 would impact Taxiway A if the new full length parallel taxiway has not been constructed as part of the relocation of Runway 11-29. While temporary airfield access could be provided should the terminal be built before the runway is relocated, such apron access could not tie directly into Runway 11-29 per the current FAA recommendations. For GA Site 2 airfield access would likely have to include the second phase of Taxiway H unless the parallel runway and its initial taxiway system on the east end have been constructed beforehand. GA Site 3 requires that the first phase of Taxiway H be completed to provide access to either Runway 06 or Taxiway C.

Overall GA Sites 1 and 4 would have the best airfield access with the only difference being GA Site 1 is more centrally located on the primary runway. GA Sites 2 and 3 rank lower as they are both off the crosswind runway, with GA Site 3 being the furthest from most airfield facilities.

Landside Access

The ability for the flying public to easily access the facilities envisioned for the general aviation terminal area is of significant importance. All four sites benefit from existing roadways as well as utilities for the proposed terminal. GA Sites 1 and 4 have access to SR 100 and therefore the most direct to the Interstate 95 interchange. For both sites along Runway 06-24, the access is not as direct since the new south access road ties into Belle Terre Boulevard more than a mile and a half south of SR100.

While both GA Sites 1 and 4 have direct access to SR100 and Interstate 95, GA Site 4 ranks the highest as it is the current terminal location. Not only does this site have a shorter access route, it is known by the current aviation
and non-aviation users and provides the best visibility to those not familiar with the airport. GA Site 2 ranks lower than GA Site 3 since it would have slightly higher access times to the surrounding community.

**Operational Efficiency**

The operational efficiency helps define which sites are more advantageous to the aircraft users and managers of the airfield. GA Sites 1 and 4 afford the best opportunity to not only support the expected increase in the larger itinerant aircraft traffic, but would also promote the segregation of this activity to occur predominantly on one side of the airfield. Given the mix of larger jet and smaller training aircraft operations at Flagler, better segregation would have positive effects on the overall airfield operations as well as how aircraft are managed both on the ground and in the air.

Given the above, a terminal complex at GA Site 4 would provide a slightly better opportunity to separate large and small aircraft operations. This is because GA Site 4 is positioned almost perfectly between the small aircraft facilities (t-hangars and primary aircraft parking apron) and those for larger aircraft (clearspan hangars and corporate aircraft parking apron). A terminal at GA Sites 2 and 3 would increase the number of large aircraft along the crosswind runway flightline, with GA Site 3 again being the furthest from all other airfield facilities.

**Environmental Effects**

It is important to document any impact the potential sites might have on the surrounding environment such as wetlands, endangered species, historic sites, or even adjacent land uses. None of the four sites considered would impact any known environmental features, including the numerous wetland areas documented on the airfield property. In fact each site lies within areas that have been previously planned, prepared, or preserved for the development of airport facilities.

It is worth noting that the limited depth of the developable area associated with GA Site 1 could be increased if Aviation Drive was re-aligned to extend due east towards the on-airport cell tower. While such a re-alignment of Aviation Drive is possible, it and any development north of its current alignment would impact documented wetland areas. For the general aviation terminal, these impacts and their associated costs are not feasible, especially given that the site could still be developed without impacting the wetland areas. However, plans for the possible re-alignment of Aviation Drive are included as part of the ALP update as an option to support development along the north flightline, beyond the 20-year planning horizon. If and when that
space is needed, it would certainly depend on any environmental review required at that time.

With respect to ranking, none of the GA Sites could be penalized for environmental effects at this time. Since all four sites have been situated in areas intended for development, no environmental impacts are anticipated at this time. Therefore, while this is an important evaluation criteria each site will be ranked with a one at this time.

**Expansion Capability**

Having the capability to accommodate additional facilities in the long term can make a site more advantageous over others. For each of the general aviation terminal sites, there is adequate space to provide the type and size of facilities required during the planning period. However, how that space can be configured varies between the different sites.

For example, while there are a number of layouts that could be created for GA Sites 1, 2, and 3, the limited depth of these areas would force development of the terminal facilities in a linear fashion along the flightline. While this could work for some smaller facilities, those required for the type and size of aircraft at Flagler would likely end up too spread out. Additionally the proximity of GA Site 2, and to a lesser extent GA Site 3, to the ATCT will impact the flexibility of the hangars and aircraft parking arrangement for the larger jet aircraft.

For GA Sites 1, 2, and 3, the limited depth would also impact the ability to provide one central automobile parking area for the complex. Instead each facility would likely have to have individual parking spaces or in some cases parking on more than one side of the building. Conversely, the depth of GA Site 4 would allow all of the automobile parking to be accommodated in the space between the current flightline and Airport Road. The remaining depth to the 25’ BRL would enable a number of different configurations for the ultimate buildings, taxilanes, aircraft parking areas, or other terminal facilities.

Therefore, GA Site 4 is considered to have the most capability with respect to the layout and ultimate expansion of terminal facilities. GA Site 3 is the next best as the developable area expands to the southwest, providing the ability to expand facilities in the future. GA Site 1 is the next best and GA Site 2 is the least capable of expansion given its size and proximity to the ATCT.

**Construction Phasing**

The last consideration is the development impact each site might have on existing facilities and operations during construction. The construction of a
general aviation terminal and its initial support facilities at GA Sites 2 or 3 would not impact any existing facilities. Conversely, development of GA Site 1 would require the landside access to traverse Taxiway A, which depending on how it is utilized in the future may not be a significant impact. Clearly GA Site 4 would impact the most facilities in the existing terminal area.

Impacts to operations during construction would vary and depend primarily on when some of the other airfield improvements are completed. Regardless, for each it is assumed only minor impact to operations would occur, which would be included as part of the construction phasing plans.

Because GA Sites 2 and 3 are considered greenfield alternatives, they rank the highest for constructability. Perhaps the only difference between the two is that more temporary obstructions to the ATCT line of sight would likely result from construction equipment at GA Site 2. The next best site with respect to potential construction impacts is GA Site 1, while GA Site 4 would have the most potential impacts.

PREFERRED GENERAL AVIATION TERMINAL SITE

Each of the four general aviation sites were ranked based on the key qualitative elements described above. Table 5-1 shows these rankings, which ranged from 1 to 4, with number 1 being the best rank. Because each qualitative element carried the same weight, the site with the lowest total or average was considered the most advantageous.

<table>
<thead>
<tr>
<th></th>
<th>GA Site 1</th>
<th>GA Site 2</th>
<th>GA Site 3</th>
<th>GA Site 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airfield Access</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Landside Access</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Operational Efficiency</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Environmental Effects</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Expansion Capability</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Construction Phasing</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
<td><strong>17</strong></td>
<td><strong>15</strong></td>
<td><strong>10</strong></td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>2.0</strong></td>
<td><strong>2.8</strong></td>
<td><strong>2.5</strong></td>
<td><strong>1.7</strong></td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

Both GA Sites 2 and 3 could be utilized for the development of the future general aviation terminal facility. However, when all of the slight disadvantages are
combined, the two sites north of Runway 11-29 are more advantageous. Both GA Sites 1 and 4 have available airside access, the most direct landside access, no limitations with respect to the ATCT line of site, and are along the primary instrument runway for the airport.

As shown in Table 5-1, GA Site 4 is preferred alternative even though the full development of this site would impact existing facilities. Depending on the final configuration of facilities, it is entirely possible that portions of the impacted facilities such as the airport administration building space and/or automobile parking could be incorporated into the phasing plans. It is not likely that the current hangar (connected to the airport administration space) could be utilized during construction given its need for uninterrupted airfield access. The ability to address these impacts with construction phasing is considered better than the limited depth of the developable space of GA Site 1. Development of GA Site 4 is included in the refined alternatives section at the end of this chapter.

5.04-4 Aircraft Hangars

While two clearspan hangars were included in the comparison of the general aviation terminal sites, those facilities are envisioned to support the various services of the ultimate complex. Even though each would certainly provide aircraft storage space, it is assumed most would be related to itinerant aircraft. Therefore, the following sections describe other areas for hangar development, which include the t-hangars and clearspan hangars needed to accommodate the expected individual or aviation related business aircraft based at Flagler.

T-HANGAR DEVELOPMENT

As documented in the forecast chapter, 37 people remained on the t-hangar waiting list after the newest t-hangars were leased at the end of 2012. When combined with the expected growth in based aircraft, this documented demand for t-hangars resulted in the need for at least 30 additional t-hangar units by the end of the planning period. This demand has been doubled to 60 units in order to help identify the best location for these facilities beyond the planning horizon.

Figure 5-5 provides general layouts of 60 t-hangar units for the three t-hangar sites under consideration (reference Figure 5-3). Each reflects taxilanes with the minimum width of 25 feet and an object free area of 79 feet required for ADG I and TDG 1 standards of small single and light multi-engine aircraft. Wider taxilanes may be required if the selected configuration of the future t-hangars is such that they would be in an area also utilized by larger aircraft. For the actual t-hangar footprint, two different sized nested t-hangars are recommended. As detailed on Figure 5-5, one is slightly larger with additional door height clearance, but both have the potential of including a larger clearspan hangar space at one end or the other. The larger 10 unit t-hangar footprint was used for t-hangar layouts in Figure 5-5.
RECOMMENDED NESTED T-HANGAR BUILDINGS

TYPICAL SIZE A
TOTAL AREA = 2,575 SF
CLEAR DOOR HEIGHT = 12
COMMON WING
DEPTH = WIDE 95'-45
PLено 450

TYPICAL SIZE B
TOTAL AREA = 1,900 SF
CLEAR DOOR HEIGHT = 14
COMMON WING
DEPTH = WIDE 85'-45
PLено 444

NOTE: END UNITS CAN BE CONFIGURED TO PROVIDE RESTROOMS, STORAGE SPACE, OR A UNIT WITH MORE SPACE.
T-hangar Site 1

The first area considered for the expansion of t-hangar facilities is on the west end of the Runway 11-29 flightline. This area is adjacent to the existing t-hangar buildings, including the two newest constructed in 2012. Landside access into the site would have to come off the end of Old Moody Boulevard as shown. This ensures Taxiway A is not bisected by the road and provides the best separation of aircraft from automobile and pedestrian (t-hangar tenants) traffic. It should be noted that the proposed t-hangar buildings will only be approximately 17 feet in height; thus their location inside the 25’ BRL is of no consequence.

T-hangar Site 2

The second site considered would also be along the Runway 11-29 flightline, but in the open area between the corporate aircraft parking apron and Taxiway E. The required landside access off Aviation Drive will bisect Taxiway A. Even if an automobile parking area could be located between Aviation Drive and Taxiway A, such a location would require the t-hangar tenants to cross Taxiway A on foot to get to their units. As with T-hangar Site 1, the proposed buildings’ proximity to the 25’ BRL is of no consequence.

T-hangar Site 3

A site was also considered towards the southwest end of the Runway 06-24 flightline. The configuration shown provides the spacing necessary to ensure aircraft movements along the t-hangar access taxilane would not impact or be impacted by those aircraft using the future run-up area. This setback and the overall arrangement of the hangars also ensure the proposed buildings would not impact the ATCT line of site requirements. Landside access would be off the new south access road into this area.

Preferred T-hangar Site

The initial sites were chosen for their ability to accommodate the additional 60 t-hangar units and associated taxilanes with airfield access. Each also possesses the same general proximity to the necessary landside access, utilities, and drainage infrastructure. Therefore, it is assumed the cost to develop any of the sites would be relatively similar, so other characteristics were considered to determine the best alternative.

A significant advantage to T-hangar Site 1 is that all of the t-hangars would be consolidated into one area on the airfield. Because these hangars are sized for small single and light multi-engine aircraft, this minimizes mixing different size aircraft. This is perhaps the single most important factor when comparing
The only potential drawback to this site is how landside access and automobile parking is provided. Both will depend on the ultimate plan for the expansion and redevelopment of the flightline once Runway 11-29 has been relocated.

Conversely, T-hangar Site 2 would split the existing (64 units) and any future t-hangars to each side of the general aviation terminal facility along the Runway 11-29 flightline. While t-hangars in this area would have direct landside access and automobile parking off Aviation Drive, the hangars would be located adjacent to the largest clearspan hangars on the airfield as well as the corporate aircraft parking apron.

With regard to the mix of different size aircraft, development of T-hangar Site 3 along the Runway 06-24 flightline is a better option than T-hangar Site 2. Additionally, the longer landside access is not considered negative as t-hangars are for private not business use. However, the development of this side of the airport has always been envisioned more for businesses and commercial operations than private small aircraft storage. In fact, it has been called the Flagler County Airport Commerce Centre with both aviation and non-aviation space advertised for development.

Therefore, T-hangar Site 1 is the preferred area for any future t-hangar buildings. As described, the landside access might be the most significant drawback; however, this would only be a problem if the relocation of Runway 11-29 were a number of years out. Given that the airport just built 20 new t-hangars in 2012 and the relocation of the runway should occur within the next year or two, the ability to develop additional t-hangars in this area works well for the redevelopment and expansion of the new Runway 11-29 flightline. This includes the eventual need to upgrade and/or replace the existing aviation fuel storage tanks and self-service pumps. While these facilities are kept in good condition, they were installed well over 20 years ago and do not provide space for the airport’s fuel trucks nor is it centralized to the daily fueling activities. Development of T-hangar Site 1 is included in the refined alternatives section at the end of this chapter.

CLEARSPAN HANGAR SPACE

For the 20-year planning horizon, it was projected that clearspan hangar space would be needed for at least 34 new based aircraft. Therefore, different sizes of large and small clearspan hangars should be planned, as the actual need may not be known until the design is considered. As with the existing clearspan hangars, these will be used for individual private storage, multiple aircraft storage, maintenance, avionics repair, etc.
With the preferred general aviation terminal and t-hangar sites, as well as the aforementioned Flagler County Airport Commerce Centre, the Runway 06-24 flightline provides the ideal location to plan for a variety of clearspan hangar options. However, as described in the following sections, the Runway 06-24 flightline will also need to accommodate some of the other airport facilities. Along the north side of the airport, the area between the corporate aircraft parking apron and Taxiway E provides another area where the airport can offer sites for the development of the larger clearspan hangars. Combined, these two areas (shown on Figure 5-3) should accommodate the space required; however, other open areas should also be considered in order to provide a number of parcel options, including the ability to offer some larger airside sites for businesses requiring multiple structures like a flight training and/or aviation manufacturing center.

For development beyond the 20-year planning period, the re-alignment of Aviation Drive would provide additional sites along the Runway 11-29 flight line for aviation related development. Other airport property areas that could be developed for one or more hangar facilities include the northeast end of Taxiway E, to the northeast of the future runway intersections (off of the old ATCT access road), and to the west of the proposed t-hangar expansion (shown on Figure 5-3). Ultimately, some hangar facilities could also be developed on the west side of the airport. However, as mentioned previously, the costs for the necessary landside access and utilities prevents the realistic development of this area until after most of the other areas are built out.

5.04-5 Aircraft Parking Apron Space

The new general aviation terminal area includes an expansion of the current aircraft parking apron. However, this expansion would not provide all of the space required by the end of the planning period. Additional projects will need to reconfigure and improve the current apron areas on the north side of the airfield. To the west of the future general aviation terminal area, the apron area will be expanded toward the relocated runway and taxiway system, thus providing additional depth and the ability to rearrange the layout of the existing primary aircraft parking apron. To the east, a similar expansion of the corporate aircraft parking apron towards the relocated runway system would provide additional opportunities for the existing and future clearspan hangars on this side of the flightline. However, due to the public heliport described in a following section, this expansion could not tie into the general aviation terminal apron (see Figure 5-6).

While the southeast side will predominately serve individual clearspan hangars as described previously, additional aircraft parking apron space should also be reserved. On a regular basis, the County receives inquiries from different aviation businesses looking for facilities, including a large apron area for their operation. A conceptual apron area on the south end has been developed as it enables the airport to preserve such space for a large operation, but also works well with the lower allowable heights.
due to the ATCT line of sight (see Figure 5-7). Finally, as described in the section on seaplane facilities, aircraft parking space has also been considered for the current and future operators of those types of aircraft. These new and reconfigured apron areas are included in the refined alternatives section at the end of this chapter.

5.04-6 Aviation Fuel Storage Areas

As documented, the current aviation fuel storage tanks need to move to a more centralized location when they are upgraded in the near future. An area for new 100LL and Jet A tanks has been reserved on the eastern side of the future general aviation terminal area. This space is large enough that the future storage capacity for both fuel types could be doubled (future capacity of 24,000 gallons for each fuel type) and also provides space for fuel truck parking and a supply shed. Landside access for the fuel deliveries would be directly off Aviation Drive via a secure access driveway. In addition, a self-service pump island has been reserved between the tanks and the TOFA for Taxiway A1. This area would enable the self-serve island to be configured such that two aircraft could self-fuel at the same time (see Figure 5-6).

Space for a second fuel storage and self-serve island has been reserved on the southeast side of the airport (future capacity of 12,000 gallons for each fuel type). As the Runway 06-24 flightline is developed, this facility will become increasingly important to maintain the safety of ground operations at the airport. A second fuel storage and self-service area, as well as fuel trucks would eliminate the need for aircraft or vehicles to cross the airfield for fueling services. While an interior access road around the critical runway areas could be created for the fuel trucks to access the southeast side, this option was not considered further. The primary reasons for elimination include the costs for construction, wetland mitigation, and possibly land acquisition, as well as the drive times and related wear that would be imposed on the airport’s fuel trucks. Therefore, a space has been reserved in front of the ATCT that would tie into both Taxiway H and the future taxiway south of Runway 11R-29L (see Figure 5-7). This area works well for the fuel storage trucks and self-serve pump island, as the area is limited for other development due to the proximity of the ATCT and odd parcel shape/size due to the convergence of the future RVZ and BRL.

For the future fuel storage areas, all 100LL and Jet A tanks would be above ground and double walled with monitoring of the interstice space between. Unless regulations change, this type of installation would eliminate the need for a secondary containment area for the bulk storage of the tank. However, some secondary containment or catchment areas will likely be required in the transfer area for tank piping/equipment and those tank vehicles loading/unloading fuel. Layouts for the relocated and secondary fuel storage areas are included in the refined alternatives section at the end of this chapter.
5.04-7 Electrical Vault

The facility requirements indicated that with modifications, the existing electrical vault would have adequate space to house the additional airfield lighting and electronic navigation equipment expected over the planning period. It was also mentioned that a larger facility adjacent to the existing structure might be the best option to facilitate the necessary upgrades and/or phasing of improvements. While both are valid options, the fact is that the current vault site will be impacted by the ultimate build out of the general aviation terminal area. Even if relocated in the same area, it will become further removed from the airfield facilities it serves after Runway 11-29 is relocated and the new parallel runway is constructed.

As with the second fuel storage area, a site has been reserved in the area between the ATCT and Taxiway H for a new 1,000 square foot electrical vault (see Figure 5-7). Preserving a vault of this size ensures adequate space for the ultimate electrical equipment required for the airfield, including a back-up generator, maintenance/repair shop, and storage for equipment/spares. The new vault site is incorporated in the refined alternatives section at the end of this chapter.

A commitment to relocate the electrical vault on this side of the airport needs to be made prior to constructing the new parallel runway and the next major rehabilitation or reconstruction of Runway 06-24. This would enable the proper home run ducts to be designed and installed with those projects, thereby avoiding the need to saw cut and patch any of the newer airfield pavements.

5.04-8 Public Heliport Facility

The existing area utilized for public helicopter operations needs to be relocated as part of the general aviation terminal area improvements. Using the required physical dimension and setbacks from the facility requirements, both sides of the future general aviation terminal area were considered for the establishment of a public heliport. Each attempted to locate the facility as close as possible to the general aviation terminal building. This effort required a balance between needing access to the active airfield movement areas as well as ensuring the various protective surfaces and rotorwash from operations would not impact any individuals, vehicles, buildings, or aircraft parking areas.

The option of a heliport on the west end of the future terminal apron would move the rotorcraft operations closer to the existing and future small aircraft facilities. This creates a higher potential for problems with rotorwash affecting small aircraft that are either parked or moving through the area. Conversely, a location on the east side of the terminal apron would not impact any small or large aircraft facilities. When the heliport’s final approach and departure paths are taken into consideration, the site on the east end of the terminal apron would also enable the required arrival/departure
surfaces to be established very similar to those of the current public heliport procedures.

Therefore, a public heliport will be located to the southeast corner of the future general aviation terminal area apron (see Figure 5-6). The final site ensures the various setbacks required for the critical design rotorcraft (Eurocopter AS350B) are also outside of the critical runway and taxiway surfaces. This includes the ability for helicopters to remain parked on the heliport without obstructing the imaginary surfaces of the future precision approach to Runway 11L. The future public heliport site is included in the refined alternatives section at the end of this chapter.

5.04-9 Seaplane Facilities

While the forecasts did not include separate seaplane projections, the airport does have seaplane flight training operations based at the airport. In addition the airport also receives regular inquiries from seaplane owners and businesses interested in conducting seaplane activity at the airport. Much of the interest by seaplane operators centers on the fact that Flagler is the only airport in Florida that has a designated sea lane (Runway 18W-36W) and seaplane facilities entirely within the airport property boundary. This allows seaplane operators to access services available at the airport as well as being assured they will not have to share the sea lane with other water vehicles such as boats, jet skis, wind surfers, etc.

EXISTING DOCK AND RAMP IMPROVEMENTS

As described in the facility requirements, the current substandard dock and ramp are in poor condition and need to be improved for the current seaplane operations. As illustrated on Figure 5-3 the current seaplane dock and ramp are located entirely within the RPZ to Runway 06. Discussions with the FAA in early 2014 confirmed that since these aviation facilities exist, their reconstruction and/or expansion are not subject to the alternatives analysis required in the current FAA guidance for compatible land uses within the limits of a RPZ. Therefore, the existing facilities will be replaced in their current location. Based on recommendations in FAA AC 150/5395-1A, Seaplane Bases the new dock and ramp should have the following characteristics:

**Dock** – Pier from landside at 8 to 10 feet wide with hand railings on both sides. The pier should extend into Gore Lake the distance necessary to guarantee a water level of at least 3 feet. In this area, the pier should expand to an open deck measuring approximately 30 by 50 feet.

**Ramp** – Needs to be at least 15 to 20 feet wide for the activity at Flagler. Since concrete is not suitable for most seaplanes, the ramp should consist of a wood plank platform, not exceed a 6:1 slope, and extend out into the water until it is 1.5 to 3 feet below the surface.
DEVELOPMENT OF FUTURE SEAPLANE FACILITIES

While the FAA has stated that the current seaplane facilities can be improved, the current location within the RPZ to Runway 06 should not be the permanent location for these facilities. This is especially true as it relates to the ability for the public to safely access the facilities. Therefore, two sites outside of the Runway 06 RPZ were considered for the future development of public seaplane facilities. As shown on Figure 5-3, Seaplane Facility Site 1 is on the north side of the RPZ and Seaplane Facility Site 2 to the south. No sites were considered on the north or south shores of Gore Lake due to the RPZs and Approach Surfaces of the designated sea lane. The west side of the lake was also excluded from consideration as it could not tie into the physical airport facilities.

Given that the first phase of Taxiway H (between the Runway 06 threshold and Taxiway C) will be completed soon, both sites possess the same ability to connect the physical airport facilities with Gore Lake. Depending on the extent of development, both sites would also have some level of wetland impacts. However, Seaplane Facility Site 2 has three distinct advantages which eliminate Site 1 from further consideration. The first advantage is that only Site 2 can truly provide the much needed landside access for the public. The site also includes a significant amount of upland areas that make it much more environmentally feasible.

The third advantage of Site 2 is not as obvious, but equally significant. For both sites, a taxi channel off of Gore Lake would be required due to the proximity of the designated sea lane to the eastern shore of Gore Lake. As the level of activity increases, a proper maneuvering area outside of the designated sea lane will be required for access to/from the dock and ramp area. While a taxi channel could be excavated for either site, Site 2 includes an abandoned canal that was reportedly used by the military for seaplane operations. While this canal (between Gore Lake and the closed taxiway south of the Runway 06 threshold) is no more than a ditch now, it would certainly be much easier to convert to a taxi channel than constructing a new channel on the other side. A proposed layout for future seaplane facilities is included in the refined alternatives section at the end of this chapter (see Figure 5-7).

5.05 NON-AVIATION RELATED DEVELOPMENT

Those areas that are adjacent and/or have the ability to access the runway and taxiway system must be reserved for aviation related expansion. However, any land that is not needed for the ultimate airfield facilities should be used for economic development opportunities. Non-aviation development represents a significant revenue source and much needed diversification for the overall development of the airport property.

A separate assessment study of the industrial and flex developments around and including the Flagler County Airport were conducted in the first half of 2013. While the study area did not encompass all of Flagler County, it did provide a market
analysis for the approximately 130 acres of on-airport property (primarily the Flagler County Airport Commerce Centre on southeast side of Runway 06-24) identified with the potential for future aviation related or other commercial development. The study compared the airport and its surrounding area to those of similar industrial/flex developments in Northeast Florida, to include site requirements, industry trends, and best management practices for the development of such facilities. Relevant sections of this analysis have been used in the following sections.

5.05-1 Flagler County Industrial Market Assessment

The market research indicates existing and planned, contemporary industrial and flex developments in Northeast Florida generally range in size from approximately 30 to 125 acres within the middle of the marketplace. These developments are located almost exclusively within one to two miles of major highway or interstate access and can accommodate buildings upwards of several hundreds of thousands of square feet in size. Such developments range between 0.20 and 0.40 in floor-to-area ratios, reflecting broader national trends in intensity of development.

Overall, the research indicated a broader presence of large-scale industrial buildings within Northeast Florida; however, there is a relative absence of such facilities within Flagler County. The profile of building size within the County and the area around the airport generally trends smaller, reflecting the slower absorption of buildings by users and associated smaller tenant types. While there may exist an opportunity to serve a market gap for larger facilities on the southeast side of the airport, the circuitous nature of access via Belle Terre Boulevard to this side of the airport makes the site slightly less attractive for such facilities. This route locates development sites on the southeast side of the airport approximately five and a half miles away from Interstate 95; this is sub-par for the prevailing market. Regardless, the southeast side of the airport may be most optimally positioned for buildings in the 10,000 to 25,000; 25,000 to 50,000; and 50,000 to 100,000 square feet ranges given land availability, access, and prevailing absorption potential. These building sizes suggest that prudent planning preserve the ability to accommodate a mix of sites ranging from two to five acres as well as the ability to provide two to three sites of up to ten acres each.

Notably absent in the Flagler County marketplace are well-planned industrial parks with branded marketing and design standards or consistent development guidelines. Within the County, the most closely aligned product to this standard is the Pine Lakes Industrial Park (Commerce Boulevard) in Palm Coast, but it is far from Interstate 95, limited in size, largely occupied, and rather dated. The relative scarcity of such product may present an opportunity for the airport to secure a position within the market as a best-in-class industrial/flex development site.

In addition to conceptual land use planning, other activities have been observed in those economic development areas exhibiting the most pro-active approaches to industrial/flex development. These activities include preliminary site due diligence...
and/or preparation including utility infrastructure, roadway access, appropriate zoning, and compatibility with existing vicinity land uses and environmental requirements. Of particular importance are site preparation plans coordinated through utility providers for necessary electric and natural gas service to the available property as the prevailing industry has the expectation these plans, if not the utility infrastructure itself, are already in place. Many of these activities have already been initiated or completed at the airport, which positions it more favorably among competitive sites as future development occurs. What remains to be seen is what level of market demand or momentum will ultimately exist given the County’s historical deliveries of these product types.

The general inability of airports to sell property, and thus use ground lease real estate structures, typically places constraints on land use to maintain FAA grant assurances. That said, of the major real estate sectors, industrial development responds to ground lease structure requirements somewhat more favorably than other sectors given the prevailing lower cost basis of land for such uses and the natural functional obsolescence cycle of industrial facilities which requires more predictable reinvestment cycles which may align well with lease timeframes. A significant challenge; however, remains for the airport in that the broader marketplace provides a substantial inventory of commercial vacant land which is both well-located and offered on a fee simple basis.

These factors need to be considered to help the airport promote its strengths as well as address any potential market challenges for future on-site development. The marketplace assessment summarized with the following recommendations with respect to implementing industrial/flex development on the available non-aviation related airport property:

- Provide for two to five acre development sites and a limited number of sites up to ten acres in size.
- Target development intensities of .20 to .40 floor-to-area ratios.
- Focus primarily on the midscale market which ranges between 25,000 to 100,000 square foot facilities, but retain flexibility to accommodate tenants outside this range as opportunities arise.
- Develop a phasing strategy for takedown of the property to guide planning, due diligence, and infrastructure investments.
- Engage the commercial brokerage community to broaden awareness of the available property and develop a brokerage compensation policy.
- Continue coordination with economic development representatives to leverage any available incentives and assistance.
If a future opportunity presents itself, establish formal access/egress from the southeast side of the airport property eastward to make a more direct connection to Interstate 95.

5.05-2 Areas Available for Non-Aviation Uses

Suggestions from the marketplace assessment were utilized to layout those areas deemed not necessary for the future airfield infrastructure or the development of aviation related facilities. This primarily includes the area to the southeast of the new south access road along the Runway 06-24 flightline, which effectively bisects the area into aviation and non-aviation uses (see Figure 5-7). To address the sub-par landside access of this area mentioned in the assessment, future development plans include ultimately extending the new south access road east to Seminole Woods Parkway. The alignment shown for this road takes it around the north side of the ATCT, then turns east to remain clear of the future parallel runway surfaces, and aligns it to minimize wetland impacts.

On the north side of the airport, there is an undeveloped parcel at the entrance of the airport south of SR 100. With access possible from both Aviation Drive and Airport Road, this area provides approximately 5.5 acres of vacant space that could be used for non-aviation commercial development (see Figure 5-6). Another parcel just south of SR 100 in the northwest portion of the airport offers 2.8 acres of potential commercial development space (not shown on Figure 5-6). Since this parcel is not contiguous with the rest of the property, it can be dedicated to non-aviation development; however, some site limitations exist due to the proximity of the future RPZ limits and existing drainage infrastructure.

5.05-3 Foreign Trade Zone Status

As plans continue to promote the available non-aviation sites, the airport’s Foreign Trade Zone (FTZ) status should be discussed. FTZs are secure areas under the jurisdiction of the U.S. Customs and Border Protection (CBP) where domestic and foreign goods are treated as if there were outside the borders of the U.S. The advantage for certain industries is that merchandise can be imported and exported from the zone without being subject to customs duties and/or other taxes. Items brought into the zone can be used for storage, exhibition, assembly, manufacturing, or processing, avoiding any CBP procedures or payments until the materials or merchandise leave the zone for sale/use in the U.S.

The Flagler County Airport is included as part of FTZ #198, which was established by Volusia County in 1993. FTZ #198 also includes the airport business/industrial parks of the Daytona Beach International, Ormond Beach Municipal, and DeLand Municipal Airports, as well as one non-airport park (Pine Lakes / Palm Coast Industrial Park). For any businesses wanting to take advantage of the benefits, a
program for the use of the FTZ would have to be accepted and a CBP agent assigned for its management. This agent would ensure the various requirements are maintained and approve all items entering and leaving the zone.

The steps necessary to activate the FTZ for a business at the Flagler County Airport were outlined in the 2009 Palm Coast / Flagler County Airport Area Master Plan. This document included the following steps:

1. Develop a procedures manual which clearly defines the operations of the applicant business. This includes an explanation of the inventory and record keeping system used by the applicant business and their security systems.

2. Enter into an Operators Agreement with FTZ #198 Grantee, Volusia County.

3. Compile a list of employees that will have access to the zone. The list must include the employees’ names, dates of birth, and social security numbers.

4. The applicant business must secure bonding for the purposes of operation in the zone. The bonding process usually takes between one to four months to complete.

5. If the applicant business is a manufacturing firm, the applicant is required to submit a Manufacturing Request Application to the U.S. Foreign Trade Zones Board. This process may take up to one year to complete.

Since no businesses have requested activation or gone through the steps above, there is no CBP agent currently available to the Flagler County Airport portion of FTZ #198.

5.06 REFINEMENT OF SELECTED ALTERNATIVES

This section provides additional detail on the various preferred alternatives and how they have been refined to begin creating the overall airport development plans. For all future development, the primary consideration is to preserve the ability to provide the ultimate airfield configuration as identified, then the necessary airport facilities as demand requires. The layouts shown in the following figures reflect input received from the Board of County Commissioners, Airport Advisory Board, County staff, ATCT management, FAA, FDOT, airport tenants, users, and public during the various presentations and workshops for this study.

5.06-1 Redevelopment of Runway 11-29 Flightline

Key components for the redevelopment of the Runway 11-29 flightline include the preferred sites of the future general aviation terminal and t-hangar facilities. The
combined layout of these and other facilities are shown in Figure 5-6 with the following sections providing additional detail for their future development.

GENERAL AVIATION TERMINAL AND RELATED FACILITIES

The conceptual layout of the general aviation terminal facilities includes two large clearspan hangars, an aircraft parking apron off the future parallel taxiway to the primary runway, and an expanded automobile parking area. The terminal building footprint is 15,500 square feet while one clearspan hangar is 22,500 square feet and the other 10,000 square feet. It should be noted that the terminal area shown is only for a single story. This would meet the terminal and airport administration space required through the year 2023. However, the building would likely be two stories to provide the additional space required beyond the 10 year planning horizon. This additional space could include such amenities as other airport businesses, meeting space, a restaurant, observation deck, etc. as none of these were included as part of the calculations for the general aviation terminal space.

The terminal configuration shown also provides the ability to include a cantilevered extension of the building roof on the west side. This provides a covered area where ADG II aircraft could taxi adjacent to the building for the drop off or pickup of passengers during inclement weather. The terminal has also been situated such that its construction could occur without the need to first demolish the existing terminal and airport administration space or the on-airport restaurant. However, as mentioned previously, the clearspan hangar attached to the current terminal could not be utilized by aircraft since it would not have airfield access during construction. Depending on the availability of hangar space at that time, it may be possible to temporarily relocate the users and aircraft of this hangar in other facilities. Another option would be to construct the easternmost clearspan hangar first.

Depending on the initial phase, this area could easily provide over 200,000 square feet of aircraft parking apron, approximately 165,000 square feet of which would be new or additional space to support the activity expected. Ultimately this space will tie into the existing aircraft parking aprons with enough space to accommodate the number of larger and medium sized jet aircraft expected on the busiest days of the planning period. If the general aviation terminal happens to be constructed before Runway 11-29 is relocated, then temporary airfield access could be provided via a connection with Taxiway D. However, for the ultimate configuration shown in Figure 5-6, the current portion of Taxiway D on the north side of the future full length parallel taxiway will need to be removed to comply with the FAA recommendation that aircraft parking areas not have direct taxiway access to a runway. Two new taxiway connectors are included which do not continue across the full length parallel taxiway. These would provide the necessary dual access to/from the expanded aircraft parking apron without a direct link onto the active runway environment.
On the landside, the conceptual automobile parking lot includes at least 100 spaces for the terminal. The current combined airport terminal and restaurant area has 67 paved automobile parking spaces and a few others in grass areas around the buildings. The phased development of the landside access and automobile parking could include temporary use of the open parcels north of the site between Airport Road and Aviation Drive. There are two smaller automobile parking areas with 10 spaces each that are for the two clearspan hangars. The layout also shows that roads to both of these lots could be extended to provide controlled vehicle access to the airside.

For the ultimate build-out of the general aviation terminal concept, the size of the second clearspan to the west was reduced from the initial alternatives. This provides the ability to construct a taxilane with TDG 2 standards to access the existing clearspan hangar sites just east of the t-hangars. The smaller clearspan hangar could also be constructed without relocating the electrical vault or restaurant. Clearly the ultimate phasing will depend on the demand and funding available at that time.

**LAYOUT OF FUTURE T-HANGAR BUILDINGS**

A final layout for the selected t-hangar site is included as part of Figure 5-6. In this layout, the two different nested t-hangar building sizes illustrated in Figure 5-5 have been utilized. The two buildings on the north side of the site are based on Erect-A-Tube’s N54-42 or Fulfab’s LK42 nested t-hangar models, measuring 54 feet wide by 231 feet long with 10 units each. The four buildings on the south side of the site would be the same as those built in 2012, thus providing the slightly larger footprint of the Erect-A-Tube N60-45 or Fulfab LK44 models at 60 feet wide by 247.5 feet long, also providing 10 nested t-hangars for each building. Without any special end unit modifications, each building size could accommodate multi-engine piston models such as the Cessna 310 or Piper Aztec, given the individual unit dimensions, including the clear width and height of the doors. As required, there is a minimum of 79 feet between each hangar for the taxilane OFA, which also provides the anticipated NFPA spacing between buildings.

The two north t-hangar buildings require the relocation of the aviation fuel facilities and would have automobile parking directly off Old Moody Boulevard. For the other t-hangar buildings, landside access would come in from the west end of the flightline, terminating at an automobile parking lot that could also serve another hangar site or even common use aircraft wash rack at this end of the airfield.

**OTHER FACILITY IMPROVEMENTS**

As described previously, the redevelopment of the Runway 11-29 flightline will include the establishment of a public heliport and new fuel storage area. Both of these are shown on the east side of the future general aviation terminal facilities in Figure 5-6. Each facility has been configured with respect to the ultimate layout, but also with the ability to be constructed before Runway 11-29 is relocated and/or the
general aviation terminal constructed. This is particularly advantageous for the fuel storage facility as it will need to be relocated before the next 20 t-hangar units can be constructed. The new fuel storage tanks and self-serve area would require the relocation of the airports segmented circle, which is not in the best location anyway. A new segmented circle and lighted windsock location has been reserved almost due south of the current site, between the future ROFAs for the parallel runways.

Other proposed improvements include an expansion of the corporate aircraft parking apron and additional sites for the development of private clearspan hangars. Under the proposed reconfiguration, the expansion of the corporate aircraft apron is limited to the south due to the overflights of rotorcraft to the public heliport. While an apron in this area would have sufficient vertical clearance to the future heliport surfaces, the potential effects of rotorwash and general safety of operations limits the apron expansion. The clearspan hangars shown are general in nature as the sites will likely be developed based on the individual leasehold needs.

5.06-2 Development of Runway 06-24 Flightline

Development of the core Runway 06-24 flightline will eventually include a number of different sized airside parcels for aviation related businesses and commercial operations. The ultimate sizes will depend on the development requirements of the individual leaseholds. For illustrative purposes, Figure 5-7 shows primarily 1.5 acre and a few 2.7 acre parcels along the airside. At each end of the flightline, areas have been reserved for the facilities described in the following sections. Similarly, the non-aviation space available has been subdivided based on the recommendations in the market assessment for a number of two to five acres sites as well as some larger 10 acres sites.

SEAPLANE FACILITIES

A conceptual layout has been created to preserve the ability of the airport to develop the seaplane facilities with safe public access and connectivity with the physical airfield facilities. These are based on the airfield requirements for RDC A-I taxiways and the recommendations of FAA AC 150/5395-1A, Seaplane Bases for the small, single-engine category seaplanes. This includes the taxi channel with a minimum width of 125 feet and depth of three feet, between Gore Lake and the onshore facilities of the proposed site.

The taxi channel ends at a semi-circle turning basin with a 200 foot radius to allow seaplanes the space necessary to maneuver in and out of the different dock and ramp areas. Space has also been reserved for an aircraft parking apron of approximately 47,500 square feet adjacent to a 10,000 square foot operations and hangar building. The site layout also includes the necessary public landside access and automobile parking.
LARGE AVIATION COMPLEX

Space at the southwest end of the Runway 06-24 flightline has been reserved for at least one aviation business that would require multiple facilities. The airport regularly receives inquiries from aviation businesses wanting to relocate or open a facility at Flagler. While some companies are more serious than others, they typically include large flight training operations, significant aircraft maintenance facilities, and different aviation manufacturing businesses. The complex shown on Figure 5-7 is based on the facilities of a large flight school operation, but the area could be configured to serve most any aviation related operation. An adjacent area of approximately five acres is also available for either another large aviation complex or an expansion of the facilities shown.

OTHER FACILITY IMPROVEMENTS

As described previously, sites for a second fuel storage area and new airfield electrical vault have been preserved on the northeast end of the Runway 06-24 flightline. For the landside, the future parcels depicted are based on recommendations from the separate industrial market assessment documented previously, enhancing the ability to offer both aviation and non-aviation space within the Flagler County Airport Commerce Centre. The option to extend the new south access road out to Seminole Woods Parkway has also been preserved even though it does not appear on Figure 5-7.

5.07 SUMMARY OF DEVELOPMENT ALTERNATIVES

The preceding sections have identified and analyzed a number of issues related to the future development alternatives of the Flagler County Airport. The options considered focused on meeting facility needs at the airport while maintaining operational efficiency and safety standards. The alternatives selected will be utilized as the basis for the development of the new ALP drawing set described in the following chapter.
CHAPTER 6 - AIRPORT LAYOUT PLAN DRAWINGS

6.01 GENERAL

This chapter describes the Airport Layout Plan (ALP) drawing set developed for the 20-year planning period of this master plan. These plans identify areas needed for aviation related development during and beyond the planning horizon, as well as the available land on the airport, which should be reserved for future revenue support. The plans will also serve as a reference for the County to evaluate existing and/or future obstruction disposition in conjunction with the Federal Aviation Administration (FAA) criteria. The ALP set presented may be amended over time to reflect changes in the airfield environment or the demand affecting future facilities.

6.02 DRAWING SET

The ALP set consists of 14 separate drawings, which have been prepared on a computer-assisted drafting system to graphically depict the recommended airfield improvements, imaginary safety surfaces, and layout of future facilities. The sheets of the ALP set meet the criteria established by the FAA Advisory Circular (AC) 150/5070-6B, Change 2, Airport Master Plans; FAA AC 150/5300-13A, Change 1, Airport Design; and the Florida Department of Transportation (FDOT) Guidebook for Airport Master Planning. This drawing set includes:

- Title Sheet
- Airport Data Sheet
- Airport Layout Plan
- Terminal Area Plans (2 sheets)
- Future FAR Part 77 Airport Surfaces (2 sheets)
- Inner Portion of the Approach Surface Plans (5 sheets)
- Exhibit A - Airport Property Inventory Map (2 sheets)

The recommended development addresses the needs first identified in the assessment of the facility requirements, which were then analyzed further to arrive at a flexible plan meeting long term airport goals. A full size version of the ALP set is on file at the Airport Director’s office at the airport as well as with both the FAA and FDOT.

6.02-1 Airport Layout Plan

The ALP graphically presents the existing and future airfield layout, key design standards, critical surfaces, and buildings, as well as the orientation of roads, structures, and other features in the immediate vicinity of the airport. Due to the multiple existing and future airfield facilities, including the five different runway
alignments, a separate Airport Data Sheet accompanies the ALP to document all airport features. The ALP becomes the official guidance for Flagler County, once approved by the FAA and the FDOT, to make decisions on the funding of airfield improvements or other requests for development on or adjacent to airport property.

Flagler County should update this drawing, including the associated Airport Data Sheet, as needed to ensure that FAA and FDOT always have an ALP reflective of current conditions. However, it should be noted that only the airport property boundary and runway endpoints were surveyed. Since no budget was available to conduct any other surveys or aerial photogrammetry, the airfield was digitized by tying the boundary and endpoint survey data with files from Flagler County’s Geographical Information System (GIS) aerial imagery.

Most of the information presented on the ALP has been analyzed in proceeding chapters, justifying the need for recommended development. This includes the need to provide additional runway capacity as well as the proper design criteria for larger business jet aircraft, which ultimately would include additional runway length. Therefore, the ALP shows the future parallel runway, Runway 11R-29L at 5,000 feet as well as an overall length of 6,500 feet for the primary runway (Runway 11L-29R).

A precision instrument approach is planned for the future Runway 11L end and straight-in non-precision instrument approaches are shown to each of the other five paved runway ends of the airport with the appropriate imaginary surfaces. Additional features include the recommended navigational aids, airfield facilities, hangar buildings, general aviation terminal facilities, aircraft parking areas, landside access, and automobile parking facilities. In addition, some features beyond the 20-year planning horizon have been included to insure their viability in the future. This primarily includes the build out of additional hangar facilities and aircraft parking apron space.

As indicated above, the build out shown reflects more facilities than what is required over the 20-year planning period. These additional layouts offer flexibility in the County’s expansion of airport facilities. It will also decrease the need for the County to update the ALP for individual projects. Regardless, none of the airport improvements shown will be constructed without approval from the Board of County Commissioners nor will any be allowed to create any offsite impacts with respect to drainage or water quality. Before construction, each project will also require an individual airspace analysis to protect the operational capability of the airfield. This will ensure that none of the future structures and aircraft parking areas will impact the imaginary surfaces required for the future runway or taxiway system.

6.02-2 Terminal Area Plans

Two Terminal Area Plans depict the same development configuration shown on the ALP drawing at a larger scale so that additional features and greater detail of the
proposed facilities can be discerned. The plans reflect the new general aviation terminal area, expansion of aircraft parking areas, additional t-hangars, and different clearspan hangar options, as well as the supporting taxiway/taxilane and landside access.

**NORTH TERMINAL AREA PLAN**

The North Terminal Area Plan depicts a majority of the existing airport facilities located between the current approach end of Runway 11 and Taxiway A-1. This area will continue to be the primary development area of the airport, including the future general aviation terminal facilities located between Airport Road and Aviation Drive. The North Terminal Area Plan reflects the new, relocated, and in some cases removed facilities that will be part of the eventual redevelopment of this area. As described in previous sections, most of this redevelopment will occur after Runway 11-29 is relocated 400 feet south and the current runway alignment utilized to develop a new full length parallel taxiway. Nearly all of the new taxiways and primary taxilanes in this area are shown at 50 feet wide to accommodate movements of Airplane Design Group (ADG) III aircraft. Where necessary, this includes the related taxiway or taxilane object free areas. The exceptions include the smaller taxilanes between the future t-hangars and the inner portions of the adjacent small aircraft parking apron, all of which have been configured to serve ADG I aircraft.

With respect to setbacks, a future aircraft parking restriction line is shown for the ADG I portion of the small aircraft parking apron along the edge closest to the relocated Runway 11-29 alignment. This provides a minimum 10 foot tail height for the smaller aircraft of this group that could be parked in this area. All of the other aircraft parking areas are outside of the future 25 foot building restriction line, thus providing adequate tail heights for most aircraft expected in this area. Special parking areas will likely need to be designated in the new general aviation terminal apron area to accommodate the ADG II and III aircraft with the higher tail heights.

The drawing also reflects the eventual closure of Taxiway B as part of the apron expansion, but only after the relocation of Runway 11-29 and the establishment of a future public heliport. The current portion of Taxiway D north of the future full length parallel taxiway is also shown as being removed to eliminate direct runway access from the future aircraft parking apron. The primary airside relocations include the 12,000 gallon fuel tanks, self-serve fuel pumps, and segmented circle/lighted windsock. Finally, the run-up area to serve the future Runway 11 end of the primary runway is shown with a layout that would allow multiple ADG I aircraft to be outside of the full length parallel taxiway’s object free area for ADG III aircraft. The final size and configuration of this run-up area will depend on need and fleet mix at time of construction. It will also need to take into consideration the final configuration of the adjacent t-hangar facilities to ensure adequate setback for the propwash associated with run-up operations.
SOUTHEAST TERMINAL AREA PLAN

The Southeast Terminal Area Plan only includes the areas between Gore Lake and where the new south access road turns east to parallel the Runway 06-24 flightline. While a number of facilities are expected between the area shown and the airport traffic control tower (ATCT), the development of these areas, both airside and landside, will vary depending on individual leaseholds. Therefore, as with the ALP, there are no specific facilities shown for any of the available parcels in this general area. Regardless, any development along the southeast flightline will require FAA approval with a detailed airspace and ATCT line of sight analysis. This is to ensure the location and height of the proposed facilities would not compromise aircraft safety for Runway 06-24, the future parallel Taxiway H, and all designated movements areas along this side of the airfield. The two predominant features of the terminal area plan include the ability to preserve the area adjacent to Gore Lake for the development of seaplane facilities and parcels that could accommodate one or more large aviation complexes.

As shown, the existing seaplane dock and ramp lie within the existing/future Runway Protection Zone (RPZ) off the approach end of Runway 06. Both of these facilities will need to be reconstructed as soon as funding is available; however, neither would be subject to review required under the FAA issued Interim Guidance on Land Uses Within a Runway Protection Zone. In January 2014, coordination between the airport and the FAA established this given that they were existing uses and that airport’s future plans to expand the seaplane facilities would eventually be outside the existing and future RPZs. To do so, the future plans include a 125 foot taxi channel and 200 foot radius turning basin to access the facilities outside the RPZ limits. It should be noted that the FAA recommends the taxi channel and turning basin have a depth of 6 feet or a minimum depth of 3 feet. However, due to the seasonal fluctuations of Gore Lake and the need to control the growth of aquatic weeds, a depth of 8 to 10 feet is actually required.

The large aviation complex is based on the type of facilities a large flight school might require. The apron and taxilanes shown are based on ADG I standards, but the area as well as the adjacent five acre parcel could be developed to accommodate ADG II or III aircraft. The flexibility of this site allows the airport to offer parcels to the aviation businesses that frequently inquire about such for aircraft maintenance, aircraft modifications, and even aircraft manufacturing, as well as flight training operations.

As with the North Terminal Area Plan, the two run-up areas shown for Runway 06 are arranged to allow multiple ADG I aircraft to be outside of an ADG III object free area for both Taxiway E and future Taxiway H. The final size and configuration of these run-up areas will depend on need and fleet mix at time of construction. The run-up area at the future end of Taxiway H will need to take into consideration the
development of the large aviation complex parcels. Specifically, wing tip clearances and propwash will need to be evaluated.

For the landside parcels, development close to the ATCT will need to consider any applicable setbacks associated with the tower site at the time of design. When the ATCT was constructed, it did not require or include a “blast hardened” structure. As such, the FAA could require certain safety setbacks for any adjacent facility with public access. In the past the FAA has scrutinized public facilities within a 300 foot radius of ATCT structures as part of Safety Risk Management Documents for tower siting. Security setbacks with radii of 100 feet and 200 feet around ATCT structures have also been evaluated in past studies. Therefore, while not depicted on the Southeast Terminal Area Plan, no public facilities should be planned any closer than 200 feet from the ATCT facility.

6.02-3 Future FAR Part 77 Airspace Surfaces

The future airspace surfaces were developed utilizing the criteria found in Federal Aviation Regulations (FAR) Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace. In order to protect the airspace and approaches to each runway from hazards that could affect the safe and efficient operation of the airport, the full extent of all airport development is utilized. FAR Part 77 criterion has been established for use by local planning and land use jurisdictions to control the height of objects in the vicinity of the airport.

The specific imaginary surfaces, which shall be protected from obstructions, include the Primary, Horizontal, Conical, Approach, and Transitional Surfaces. A description and the corresponding dimensions for each surface were included in the facility requirements chapter. The Future FAR Part 77 Airspace Surfaces must be used in conjunction with local ordinances in order for County staff to readily determine if the construction of a proposed structure will penetrate any of the protective surfaces. Current height restrictions and compatible land use zoning for the area surrounding the airport are included in the Flagler County Comprehensive Plan 2010-2035. Specifically, Objective B.1.13 of the Transportation Element outlines the County’s policies to ensure compatibility with the airport master plan, including coordination with the adjacent Cities of Bunnell and Palm Coast. Therefore, the FAR Part 77 Surfaces in this ALP set should be incorporated into the County’s Comprehensive Plan to ensure the transportation element and any other related zoning ordinance are up to date.

Although no survey was budgeted for these sheets, a search for area obstruction data was conducted. Critical structures documented in the FAA and FDOT databases are shown on the drawing and included in the obstruction data table.
6.02-4 Inner Portion of the Approach Surface Plans

The Inner Portion of the Approach Surface Plans illustrate in detail the critical surfaces within the approach/departure area off the ends of each existing and future runway. Federally obligated airports like Flagler are subject to Grant Assurances 20 and 21 which require the protection of the approach and departure surfaces. The FAA reviews all published instrument approach procedures on a periodic basis (approximately every two years). Obstacles found within the associated approach/departure surfaces will likely result in higher minima, loss of approaches, and/or loss of night operation capability.

In addition to the applicable approach and departure surfaces, these drawings reflect the Runway Safety Areas, Runway Object Free Areas, Runway Obstacle Free Zones, Runway Protection Zones, Primary Surfaces, and Transitional Surfaces off each runway end. Details are provided for objects that penetrate the criteria of these surfaces with existing and potential obstructions listed in a table for each runway end. The Approach Surfaces extend out to a height of 100 feet above the respective runway threshold, as per FAA guidance for this type of drawing.

Each of these sheets also depict the location of any roadways, structures, ground elevations, and other man-made or natural features within the limits of the various imaginary surfaces. Essentially, all of the areas within these imaginary surfaces should be kept free of obstacles that could constitute a hazard to aircraft approaching or departing the airport. It should be noted that no budget was provided to conduct an obstruction survey. Therefore, obstacle locations were digitized using County GIS aerial imagery, while their respective elevations were estimated during field visits using a digital inclinometer and topographic maps. All elevations are representative of average situations only.

6.02-5 Exhibit A Airport Property Inventory Map

The Exhibit A - Airport Property Inventory Map accurately depicts the current airport property line, including original parcels that were released and the various easements within the property limits. A second sheet has been included to document the various legal descriptions and to provide additional property details. These drawings meet the criteria established in FAA AC 150/5100-17, Change 6, Land Acquisition and Relocation Assistance for Airport Improvement Program (AIP) Assisted Projects. Specifically, the ARP SOP No. 3.00 Appendix B, Exhibit A Review Checklist.

While no survey was budgeted for the update of these sheets, they are based on recent surveys conducted for the county. These primarily include the full airport boundary survey conducted on June 24, 2010 by McMillen Surveying, Inc., as well as four different parcel surveys conducted in 2013 by Kuhar Surveying and Mapping, LLC. The drawings also reflect the proposed land acquisitions identified in previous sections of the study.
## NOTES:

1. All elevations shown in inches above mean sea level (MSL). All except vegetation heights which are above approach elevations.
2. All surface high points, edges of the runway, and edges of the non-precision approach surfaces are shown.
3. The existing surface was surveyed by a surveyor. All elevations are approximate and may vary slightly from the survey. The survey was performed in accordance with the FAA's 8400 series standards.
4. The future surfaces were designed by the engineering firm. All elevations are approximate and may vary slightly from the design.
5. All vegetation that is to be removed is shown. All vegetation that is to be retained is shown.
6. All proposed vegetation is shown. All proposed vegetation that is to be retained is shown.
7. The existing surface was surveyed by a surveyor. All elevations are approximate and may vary slightly from the survey. The survey was performed in accordance with the FAA's 8400 series standards.
8. The future surfaces were designed by the engineering firm. All elevations are approximate and may vary slightly from the design.
9. All vegetation that is to be removed is shown. All vegetation that is to be retained is shown.
10. All proposed vegetation is shown. All proposed vegetation that is to be retained is shown.

---

### EXISTING/FUTURE APPROACH PLAN

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>ELEVATION</th>
<th>PREDICTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEVATION SURFACE</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>VEGETATION</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ELEVATION SURFACE</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>VEGETATION</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

### FUTURE APPROACH PLAN

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>ELEVATION</th>
<th>PREDICTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEVATION SURFACE</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>VEGETATION</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ELEVATION SURFACE</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>VEGETATION</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

### VEGETATION

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>ELEVATION</th>
<th>PREDICTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEVATION SURFACE</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>VEGETATION</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ELEVATION SURFACE</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>VEGETATION</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

### PLANNING

#### RUNWAY 06-24

INNER APPROACH SURFACE PLAN
CHAPTER 7 - CAPITAL IMPROVEMENT PROGRAM

7.01 GENERAL

The schedule of proposed capital improvements resulting from the recommendations of this master plan and the cost estimates for their development are included in this chapter. The intent is to assist Flagler County in achieving their goals to maximize revenues and minimize operating expenses, while at the same time providing safe and efficient facilities for the public. Consequently, the timing of the improvement projects proposed for the Flagler County Airport has been structured to support these goals.

The analyses conducted in the previous chapters have evaluated airport development needs based upon current and forecast aviation activity, as well as the opportunities that will exist once the airfield is reconfigured. However, a key component of the master planning process is the application of basic economic, financial, and management rationale to each development item so that a responsible and efficient implementation process can be assured. In short, these factors are critical to make the plan realistic and successful. Therefore, this section of the study is often the primary reference for decision makers. Proper understanding of the effects of a decision either for or against a recommendation will be essential in maintaining a realistic program that provides the maximum benefit to the community.

7.02 SOURCES OF FUNDING FOR IMPROVEMENTS

The following development program has been evaluated from a variety of perspectives. It is not dependent upon the County for funding. In fact, as has been the case for a number of years at the airport, the County should continue to utilize the different development grants available to the airport. Historically, the development program has been funded predominantly by sources other than those directly from the airport’s operating budget. However, this does not mean that the airport will not have to provide some share of the costs.

7.02-1 Federal Aviation Administration

At the federal level, the Federal Aviation Administration (FAA) manages the Airport Improvement Program (AIP). Funds from this program are derived from the collection of various aviation related fees. These funds are distributed under appropriations set by Congress to all airports in the U.S. that have certified eligibility. For general aviation airports, AIP grants typically include an annual entitlement grant and discretionary funding. Under the current authorization, Flagler County is eligible for annual entitlement grants of $150,000. For general aviation entitlements,
three previous years can be carried over and combined with the current year for a single project.

The limited AIP funds are distributed on a priority basis, which is established by each FAA Regional Office based upon the number and dollar amount of applications received. Flagler County will be competing with other communities in Florida and the FAA Southern Region (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, and the U.S. Virgin Islands) as well as the entire country, for these discretionary grants. The AIP discretionary and entitlement grants currently provide up to 90 percent of the funding for eligible projects.

7.02-2 Florida Department of Transportation

Each year the Florida Department of Transportation (FDOT) Aviation and Spaceports Office manages an aviation work program of state grants to planning, design, construction, and other projects. FDOT will provide up to 80 percent of the funding for most airport development; however, only 50 percent is provided if the project is directly related to economic development. FDOT funds can also be used for up to 80 percent of the costs not covered by a federal grant. In other words, FAA eligible projects are typically funded 90 percent by the FAA, 8 percent by FDOT, and 2 percent by the airport.

Consequently, close coordination of the County’s priorities with the FAA and FDOT will enhance their participation in projects at the airport. As evident by past support of the airport by both agencies, it is extremely important to maintain this coordination and to act expeditiously in securing the airport share for any grants offered.

7.02-3 Economic Development and Other Sources

A number of state programs exist that enable the airport to obtain different economic development grants. The most significant for Flagler are those related to the Rural Economic Development Initiative (REDI) under the state’s Department of Economic Opportunity. Since Flagler County has been and continues to be designated as a REDI county, the airport is eligible to request 100 percent project funding.

Another grant from the state, specifically programmed for transportation projects, is the Economic Development Transportation Fund (EDTF) grants. These are typically tied to job creation and require different local and/or private contributions to the overall project. Recently an EDTF grant was obtained by Flagler to complete the off airport portion of the south access road and related utilities. There are also funds available from the Transportation Regional Incentive Program (TRIP) and Strategic Intermodal System (SIS). TRIP grants can fund up to 50 percent of a project which is requested by an eligible group of local government, hence regional, sponsors. The SIS program for airport projects also provides up to 50 percent funding. While the
Flagler County Airport has not been designated as a SIS or even an emerging SIS airport, this could change.

Another source of development funding that is frequently overlooked is the private sector. At general aviation airports there are several instances where private development sources contribute to needed improvements. Generally, such development takes the form of privately funded facilities on land leased from the airport. This enables airports to focus their resources on maintaining safe and efficient aviation facilities.

### 7.03 AIRPORT DEVELOPMENT PROGRAM

The initial step in establishing an airport development program is to determine the cost of each proposed improvement. Cost data used in this study was collected from a variety of sources, including actual project estimates, published engineering indices, government agencies, and similar airport construction projects in the area. In addition, consideration must be given to reflect costs related to testing, survey, inspection, and other unknown contingencies. Estimates for each planning period are based on 2015 dollars.

The recommended developments of the Capital Improvement Program (CIP) are divided into three planning periods, which include a short term (2016 - 2020), intermediate term (2021 - 2025), and long term (2026 - 2035). These periods vary from those presented in the aviation activity forecasts for a number of reasons, one of which is the fact that the forecasts are based on data through the year 2012. Also, because of the time required to complete the various portions of this study, including the separate project definition study for the parallel runway, a couple of years have passed. As shown in Table 7-1, the total cost for the planned development of Flagler County Airport will be approximately $71.1 million through the year 2035.

<table>
<thead>
<tr>
<th>Planning Period</th>
<th>Program Costs (2015 dollars)</th>
<th>Estimated Airport Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Term (2016 – 2020)</td>
<td>$25,395,000</td>
<td>$1,635,600</td>
</tr>
<tr>
<td>Intermediate Term (2021 – 2025)</td>
<td>$22,565,000</td>
<td>$2,398,000</td>
</tr>
<tr>
<td>Long Term (2026 – 2035)</td>
<td>$23,185,000</td>
<td>$2,111,600</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$71,145,000</strong></td>
<td><strong>$6,145,200</strong></td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

Descriptions of the improvements for each CIP period are included in the following sections and illustrated in Figures 7-1 to 7-3 at the end of the chapter. The associated tables represent the culmination of comparative analysis of basic budget factors, need or demand, and priority assignments. Costs for the development items have been broken down based on the previous funding experiences for similar projects. 

---

7-3
allocation of funds from the agencies in no way guarantees funding from that particular source. They are simply potential sources used as part of the financial feasibility and phasing of the various projects. It should also be noted that while the County is eligible for 100 percent funding on certain projects through the REDI program, this has not been reflected in the CIP. While such funding should certainly be requested, the airport is better served by a CIP which plans for the potential local share without REDI funding.

The information in Tables 7-2 to 7-4 will be used to update the Joint Automated Capital Improvement Program (JACIP). The JACIP is a secure, internet-based program, which allows the agencies and airport management to interact on a real time basis as different funding needs and issues evolve. When the JACIP is updated, the appropriate annual increases should be applied to the 2015 cost estimates in order to ensure that the funding agencies program realistic budgets for each planned project.

7.03-1 Current Airport Projects

At the time of this writing, a number of airport improvement projects were underway and expected to be completed by the end of 2015. The first was the project to rehabilitate Taxiway E to include new lighting and widening the portion between Runway 11-29 and Taxiway A. While the primary taxiway improvements are complete, the design and construction of a run-up area at the southwest end of Taxiway E is still underway for this project. The finalization of the plans and specifications to relocate Runway 11-29 are also currently underway, as well as the acquisition of approximately 56 acres of land to support the ultimate airfield build out. Taxiway system improvements include the construction of the first part of the parallel taxiway on the southeast side of Runway 06-24 (shown as Taxiway H on Figure 7-1) and the rehabilitation of Taxiways C and D. A Wildlife Hazard Assessment will also begin in 2015.

7.03-2 Short Term Capital Improvement Program

A number of projects have been programmed for the short term CIP which focus on improving the safety standards and meeting the increasing demands. The most notable is the relocation of Runway 11-29 in 2016, which will likely extend through 2017 and perhaps 2018 depending on when construction starts. The second project is development of the plans and specifications for the new general aviation terminal. Two projects to clear the current vegetative obstructions within the approaches of both Runways 06-24 and 18W-36W are also programmed, although they would likely be combined as one. Additionally, an update to the Master Stormwater Management Plan would begin and include a formal Stormwater Pollution Prevention Plan (SWPPP) with the appropriate Spill Prevention, Control, and Countermeasure (SPCC) element.
The main project for 2017 will be the construction of the new general aviation terminal. As shown in Figure 7-1, this would include the initial phase of the terminal parking lot, but would not include any changes to the adjacent aircraft parking apron. The second project would replace the current seaplane dock and ramp facilities.

<table>
<thead>
<tr>
<th>Year</th>
<th>Project</th>
<th>Total</th>
<th>FAA</th>
<th>FDOT</th>
<th>Airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>Relocation of Runway 11-29</td>
<td>$11,200,000</td>
<td>$10,080,000</td>
<td>$896,000</td>
<td>$224,000</td>
</tr>
<tr>
<td>2016</td>
<td>Prepare Plans and Specifications - General Aviation Terminal</td>
<td>$300,000</td>
<td>$0</td>
<td>$240,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>2016</td>
<td>Obstruction Removal - Trees Runway 06-24 Approaches</td>
<td>$170,000</td>
<td>$153,000</td>
<td>$13,600</td>
<td>$3,400</td>
</tr>
<tr>
<td>2016</td>
<td>Obstruction Removal - Trees Runway 18W-36W Approaches</td>
<td>$165,000</td>
<td>$148,500</td>
<td>$13,200</td>
<td>$3,300</td>
</tr>
<tr>
<td>2016</td>
<td>Planning - Master Stormwater Management Plan</td>
<td>$220,000</td>
<td>$0</td>
<td>$176,000</td>
<td>$44,000</td>
</tr>
<tr>
<td></td>
<td>Subtotal for 2016</td>
<td>$12,055,000</td>
<td>$10,381,500</td>
<td>$1,338,800</td>
<td>$334,700</td>
</tr>
<tr>
<td>2017</td>
<td>New Construction - General Aviation Terminal (15,500 SF)</td>
<td>$3,150,000</td>
<td>$0</td>
<td>$2,520,000</td>
<td>$630,000</td>
</tr>
<tr>
<td>2017</td>
<td>Replacement - Seaplane Dock and Ramp</td>
<td>$325,000</td>
<td>$0</td>
<td>$260,000</td>
<td>$65,000</td>
</tr>
<tr>
<td></td>
<td>Subtotal for 2017</td>
<td>$3,475,000</td>
<td>$0</td>
<td>$2,780,000</td>
<td>$695,000</td>
</tr>
<tr>
<td>2018</td>
<td>New Construction - Aviation Fuel Storage Area</td>
<td>$835,000</td>
<td>$0</td>
<td>$668,000</td>
<td>$167,000</td>
</tr>
<tr>
<td>2018</td>
<td>Expansion of Corporate Aircraft Parking Apron (26,000 SF)</td>
<td>$370,000</td>
<td>$0</td>
<td>$296,000</td>
<td>$74,000</td>
</tr>
<tr>
<td>2018</td>
<td>New Construction - Public Heliport</td>
<td>$215,000</td>
<td>$193,500</td>
<td>$17,200</td>
<td>$4,300</td>
</tr>
<tr>
<td></td>
<td>Subtotal for 2018</td>
<td>$1,420,000</td>
<td>$193,500</td>
<td>$981,200</td>
<td>$245,300</td>
</tr>
<tr>
<td>2019</td>
<td>Prepare Plans and Specifications - Rehabilitate Runway 06-24</td>
<td>$550,000</td>
<td>$495,000</td>
<td>$44,000</td>
<td>$11,000</td>
</tr>
<tr>
<td>2019</td>
<td>Taxiway E Extension &amp; East Aircraft Parking Apron Expansion</td>
<td>$1,065,000</td>
<td>$0</td>
<td>$852,000</td>
<td>$213,000</td>
</tr>
<tr>
<td>2019</td>
<td>Relocation of Electrical Vault</td>
<td>$1,105,000</td>
<td>$994,500</td>
<td>$88,400</td>
<td>$22,100</td>
</tr>
<tr>
<td></td>
<td>Subtotal for 2019</td>
<td>$2,720,000</td>
<td>$1,489,500</td>
<td>$984,400</td>
<td>$246,100</td>
</tr>
<tr>
<td>2020</td>
<td>Rehabilitate Runway 06-24</td>
<td>$5,475,000</td>
<td>$4,927,500</td>
<td>$438,000</td>
<td>$109,500</td>
</tr>
<tr>
<td>2020</td>
<td>Environmental Assessment - 5,000’ Parallel Runway 11R-29L</td>
<td>$250,000</td>
<td>$225,000</td>
<td>$20,000</td>
<td>$5,000</td>
</tr>
<tr>
<td></td>
<td>Subtotal for 2020</td>
<td>$5,725,000</td>
<td>$5,152,500</td>
<td>$458,000</td>
<td>$114,500</td>
</tr>
<tr>
<td></td>
<td><strong>SHORT TERM TOTALS</strong></td>
<td>$25,395,000</td>
<td>$17,217,000</td>
<td>$6,542,400</td>
<td>$1,635,600</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

Improvements to the general aviation terminal area begin in 2018 with a new aviation fuel storage area. This includes two new 12,000 gallons tanks with landside access, a self-serve fuel area, associated taxiway access, tender truck parking, and a utility shed. Next the corporate aircraft parking apron would be expanded approximately 26,000 square feet. While this is for permanent aircraft parking space, it has also been programmed to help offset the space lost during construction of the general aviation terminal, before the larger apron expansion projects in the future. The final project will establish a public heliport at a site that will eventually tie into the ultimate aircraft parking apron for the terminal.

In 2019, plans and specifications will be prepared for the rehabilitation of Runway 06-24. In addition to improving the pavement, this project would include the addition
of blast pads off each end, new lighting, Runway End Identification Lights for Runway 06, and an Omnidirectional Approach Lighting Systems (ODALS) for Runway 24. Next the planned extension of Taxiway E and expansion of the east aircraft parking apron will be constructed. The design and environmental mitigation for this project has already been completed. The final project will be to relocate the airport’s electrical vault to the site reserved on the southeast side of the airport, between the airport traffic control tower and Runway 06-24.

In the final year of the short term planning period, the pavement rehabilitation and other improvements to Runway 06-24 described above will begin. Additionally, the required environmental assessment for the proposed parallel runway (Runway 11R-29L) will begin in 2020.

7.03-3 Intermediate Term Capital Improvement Program

As detailed in Table 7-3, projects during the intermediate term CIP primarily center on continuing to renovate and expand the general aviation terminal area. This includes the two projects that will increase the primary aircraft parking apron space between the new public heliport on the east end and the future t-hangar area on the west end. There is also a project in 2022 to replace the clearspan hangar that will be impacted by the new general aviation terminal. Other improvements along the north flightline include the expansion of the terminal parking and access, as well as 20 new t-hangar units. As new facilities are constructed, they will tie into the existing airfield perimeter fencing. However, a project to improve the airfield fencing and gates has been programmed to optimize the overall perimeter security and access.

There are also a number of projects during this period to increase the capacity of the airfield system. This includes the projects to design and ultimately construct the future parallel runway (Runway 11R-29L). Other airfield capacity projects include the design and construction of additional taxiway exits and run-up areas. There is also the final land acquisition to support the ultimate airfield build out, replacement of airfield signage, and remarking of airfield pavements. The final project is for a new airport master plan in 2025, which would include the Airport Graphic Information System (AGIS) mapping.
TABLE 7-3
INTERMEDIATE TERM CAPITAL IMPROVEMENT PROGRAM

<table>
<thead>
<tr>
<th>Year</th>
<th>Project</th>
<th>Total</th>
<th>FAA</th>
<th>FDOT</th>
<th>Airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>Expansion of Primary Aircraft Parking Apron - East Side (200,000 SF)</td>
<td>$1,725,000</td>
<td>$0</td>
<td>$1,380,000</td>
<td>$345,000</td>
</tr>
<tr>
<td>2022</td>
<td>Prepare Plans and Specifications - 5,000' Parallel Runway 11R-29L</td>
<td>$800,000</td>
<td>$720,000</td>
<td>$64,000</td>
<td>$16,000</td>
</tr>
<tr>
<td>2022</td>
<td>New Construction - Replacement Clearspan Hangar (22,500 SF)</td>
<td>$2,975,000</td>
<td>$0</td>
<td>$2,380,000</td>
<td>$595,000</td>
</tr>
<tr>
<td>2022</td>
<td>Land Acquisition - ±29 Acres for Improvements to Runway 11L-29R</td>
<td>$1,000,000</td>
<td>$900,000</td>
<td>$80,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>2022</td>
<td>Replacement - Illuminated Airfield Signage</td>
<td>$840,000</td>
<td>$0</td>
<td>$672,000</td>
<td>$168,000</td>
</tr>
<tr>
<td>2023</td>
<td>New Construction - 5,000' Parallel Runway 11R-29L</td>
<td>$8,000,000</td>
<td>$7,200,000</td>
<td>$640,000</td>
<td>$160,000</td>
</tr>
<tr>
<td>2023</td>
<td>Prepare Plans and Specifications - Runway Capacity Improvements</td>
<td>$150,000</td>
<td>$135,000</td>
<td>$12,000</td>
<td>$3,000</td>
</tr>
<tr>
<td>2023</td>
<td>Airfield Security Fencing and Gates</td>
<td>$650,000</td>
<td>$0</td>
<td>$520,000</td>
<td>$130,000</td>
</tr>
<tr>
<td>2023</td>
<td>New Construction - 20 T-Hangar Units with Taxi lanes</td>
<td>$1,770,000</td>
<td>$0</td>
<td>$1,416,000</td>
<td>$354,000</td>
</tr>
<tr>
<td>2024</td>
<td>New Construction - Runway Capacity Improvements</td>
<td>$1,400,000</td>
<td>$1,260,000</td>
<td>$112,000</td>
<td>$28,000</td>
</tr>
<tr>
<td>2024</td>
<td>New Construction - General Aviation Terminal Access and Parking</td>
<td>$965,000</td>
<td>$0</td>
<td>$772,000</td>
<td>$193,000</td>
</tr>
<tr>
<td>2025</td>
<td>Expansion of Primary Aircraft Parking Apron - West Side (170,000 SF)</td>
<td>$1,480,000</td>
<td>$0</td>
<td>$1,184,000</td>
<td>$296,000</td>
</tr>
<tr>
<td>2025</td>
<td>Remarking of Airfield Pavements</td>
<td>$410,000</td>
<td>$0</td>
<td>$328,000</td>
<td>$82,000</td>
</tr>
<tr>
<td>2025</td>
<td>Planning - Airport Master Plan with AGIS Mapping</td>
<td>$400,000</td>
<td>$360,000</td>
<td>$32,000</td>
<td>$8,000</td>
</tr>
</tbody>
</table>

INTERMEDIATE TERM TOTALS $22,565,000 $10,575,000 $9,592,000 $2,398,000

Source:  C&S Engineers, Inc.

7.03-4 Long Term Capital Improvement Program

A majority of the projects in the long term planning period focus on improving the runway and taxiway system to accommodate the size and level of aircraft demand expected. In the first year, the required environmental assessment for the ultimate extension (and widening) of Runway 11L-29R has been programmed. Following this, there are a number of design and construction projects to extend the runway, improve existing taxiways, and provide additional parallel taxiway systems. As shown in Figure 7-3, the taxiway projects would provide complete parallel taxiway systems on the north side of the primary runway, south side of the parallel runway, and southeast side of Runway 06-24, as well as a the partial parallel taxiway on the north side of Runway 11R.

Airfield improvements include establishing a precision approach to Runway 11L. After the required environmental assessment, projects in support of this effort include the required airspace survey and installation of a Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). Towards the end of the period, a project has been programmed to install ODALS to improve the approaches to Runways 29R, 11R, and 29L.

Long term hangar projects include replacement of an existing clearspan hangar in the general aviation terminal area and another 10 t-hangar units to meet the expected demand. The rehabilitation of the east aircraft parking apron and a second aviation
The planning and improvements conducted over recent years have made the Flagler County Airport one of the most significant general aviation airports in the nation. Continued support from the County, FAA, and FDOT is necessary to ensure the airport is able to continuously meet the area’s aviation needs in a safe, efficient, and timely manner. This support also ensures the airport will continue to be a key component of the economic growth for the County and surrounding communities.

### 7.04 SUMMARY

The planning and improvements conducted over recent years have made the Flagler County Airport one of the most significant general aviation airports in the nation. Continued support from the County, FAA, and FDOT is necessary to ensure the airport is able to continuously meet the area’s aviation needs in a safe, efficient, and timely manner. This support also ensures the airport will continue to be a key component of the economic growth for the County and surrounding communities.
While the 20-year development program is aggressive, all of the projects are necessary for the preservation and successful growth of the airport. The Flagler County Airport serves as an important economic engine for the area with the potential to be one of the largest creators of jobs for the area. For this reason, it should be noted that the build out shown on the Airport Layout Plan (ALP) reflects more facilities than those included in the 20-year CIP. These provide flexibility in the future improvements of the airport while also decreasing the need to update the ALP for individual developments.
APPENDIX A

ENVIRONMENTAL CONDITIONS
APPENDIX A - ENVIRONMENTAL CONDITIONS

The following sections summarize the 23 impact categories outlined in the Federal Aviation Administration’s (FAA) *Environmental Desk Reference* for the Flagler County Airport. These summaries are general in nature and have been from the 2012 Runway 06-24 Safety Area Improvements and 2009 Near Term Capital Improvements Environmental Assessments (EA). More specific information for each environmental category can be found in the individual EA studies. It should be noted that even though this information is relatively current, each future development project will require some level of environmental review by the FAA.

### TABLE A-1
ENVIRONMENTAL IMPACT CATEGORIES

<table>
<thead>
<tr>
<th>Category</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td>Biotic Resources</td>
</tr>
<tr>
<td>Coastal Barriers</td>
<td>Coastal Zone Management</td>
</tr>
<tr>
<td>Compatible Land Use</td>
<td>Construction</td>
</tr>
<tr>
<td>Section 4(f)</td>
<td>Federally-listed Endangered and Threatened Species</td>
</tr>
<tr>
<td>Energy Supplies, Natural Resources, and Sustainable Design</td>
<td>Environmental Justice</td>
</tr>
<tr>
<td>Farmlands</td>
<td>Floodplains</td>
</tr>
<tr>
<td>Hazardous Materials</td>
<td>Historical and Archaeological</td>
</tr>
<tr>
<td>Induced Socioeconomic</td>
<td>Light Emissions and Visual Effects</td>
</tr>
<tr>
<td>Noise</td>
<td>Social Impacts</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>Water Quality</td>
</tr>
<tr>
<td>Wetlands</td>
<td>Wild and Scenic Rivers</td>
</tr>
<tr>
<td>Cumulative Impacts</td>
<td></td>
</tr>
</tbody>
</table>

Source: FAA Environmental Desk Reference.

**AIR QUALITY**

An air quality analysis in accordance with National Environmental Policy Act (NEPA) is used to determine whether a project’s emissions would potentially cause significant air quality effects. In other words, cause levels of pollution that would exceed the National Ambient Air Quality Standards (NAAQS). The size of the airport and the nature of a project determine whether an air quality analysis for NEPA...
purposes must be conducted. According to FAA guidance, an air quality analysis is required once the airport exceeds 180,000 general aviation or air taxi operations per year.

With most projects, temporary construction emissions would occur, but would be minimized with the implementation of Best Management Practices (BMPs). Future airport construction emissions would not be expected to exceed the NAAQS because they are temporary in nature, typically less than a few months in duration, and BMPs would be employed in accordance with an approved Stormwater Pollution Prevention Plan. Such BMPs would include, but not be limited to, use of water trucks to control dust, monitoring/reducing vehicle speeds on the site, and stabilizing bare soil areas as soon as possible.

Regarding climate change, the FAA is seeking more guidance from the U.S. Environmental Protection Agency on how to address greenhouse gas emissions, particularly carbon dioxide emissions, at airports. However, it is not expected for any future project at the airport to have an effect on climate.

**BIOTIC RESOURCES**

Biotic resources are defined in the FAA’s *Environmental Desk Reference* as “various types of flora (plants) and fauna (fish, birds, reptiles, amphibians, marine mammals, coral reefs, etc.) in a particular area. The term also means, rivers, lakes, wetlands, forests, upland communities, and other habitat types supporting flora and aquatic and avian fauna.”

**Habitat**

The airport property includes upland areas, wetland areas, and other surface waters, some of which are maintained and others natural. Both EAs provided habitat mapping for the airport in accordance with Florida Land Use, Cover and Forms Classification System (FLUCCS). The most predominant land uses (codes) for upland areas which include: shrub and brushland (320), pine flatwoods (411), airports (811), and roads (814). For wetlands and other surface waters, the land use codes predominantly include; bay swamps (610), hydric pine flatwoods (625), wetland hardwood forest (630), fresh water marsh (641), wet prairie (643), and a man-made ditch (510).

**Plants**

Numerous plant species (ground cover, shrub, and trees) currently exist in the habitat types mentioned above. Within the vicinity of the airport, there is a potential for 22 special status plant species to occur. This includes 17 state-listed threatened and five state-listed endangered plant species (see Table A-2).
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Family</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asclepias viridula</td>
<td>southern/green milkweed</td>
<td>apocynaceae</td>
<td>T</td>
</tr>
<tr>
<td>Glandularia maritima</td>
<td>coastal mock vervain</td>
<td>verbenaceae</td>
<td>E</td>
</tr>
<tr>
<td>Habenaria nivea</td>
<td>snowy orchid</td>
<td>orchidaceae</td>
<td>T</td>
</tr>
<tr>
<td>Helianthus camosus</td>
<td>lakeside/flatwoods sunflower</td>
<td>asteraceae</td>
<td>E</td>
</tr>
<tr>
<td>Lilium catesbaei</td>
<td>catesby’s lily; pine lily</td>
<td>liliaceae</td>
<td>T</td>
</tr>
<tr>
<td>Lobelia cardinalis</td>
<td>cardinalflower</td>
<td>campanulaceae</td>
<td>T</td>
</tr>
<tr>
<td>Matelea gonocarpos</td>
<td>angularfruit milkvine; angle pod</td>
<td>apocynaceae</td>
<td>T</td>
</tr>
<tr>
<td>Nemastylis floridana</td>
<td>celestial lily; fallflowering ixia</td>
<td>iridaceae</td>
<td>E</td>
</tr>
<tr>
<td>Nolina atopocarpa</td>
<td>florida beargrass</td>
<td>ruscaceae</td>
<td>T</td>
</tr>
<tr>
<td>Opuntia stricta</td>
<td>erect/shell-mound pricklypear</td>
<td>cactaceae</td>
<td>T</td>
</tr>
<tr>
<td>Pecluma plumula</td>
<td>plume polypod</td>
<td>polypodiaceae</td>
<td>E</td>
</tr>
<tr>
<td>Pinguicula caerulea</td>
<td>blueflower butterwort</td>
<td>lentibulariaceae</td>
<td>T</td>
</tr>
<tr>
<td>Pinguicula lutea</td>
<td>yellow/yellow-flowered butterwort</td>
<td>lentibulariaceae</td>
<td>T</td>
</tr>
<tr>
<td>Platanthera ciliaris</td>
<td>yellow fringed orchid</td>
<td>orchidaceae</td>
<td>T</td>
</tr>
<tr>
<td>Platanthera cristata</td>
<td>crested yellow/fringed orchid</td>
<td>orchidaceae</td>
<td>T</td>
</tr>
<tr>
<td>Pogonia ophioglossoides</td>
<td>rose pogonia; snakemouth orchid</td>
<td>orchidaceae</td>
<td>T</td>
</tr>
<tr>
<td>Pycnanthemum floridanum</td>
<td>florida mountain mint</td>
<td>lamiaceae</td>
<td>T</td>
</tr>
<tr>
<td>Sacoila lanceolata</td>
<td>leafless beaked ladiesstresses/orchid</td>
<td>orchidaceae</td>
<td></td>
</tr>
<tr>
<td>Sarracenia minor</td>
<td>hooded pitcherplant</td>
<td>sarraceniaceae</td>
<td>T</td>
</tr>
<tr>
<td>Spiranthes lacinia</td>
<td>lacelip ladiesstresses</td>
<td>orchidaceae</td>
<td>T</td>
</tr>
<tr>
<td>Spiranthes longilabris</td>
<td>Longlip/giantspiral ladiesstresses</td>
<td>orchidaceae</td>
<td>T</td>
</tr>
<tr>
<td>Tillandsia utriculata</td>
<td>giant airplant/giant wild pine</td>
<td>Bromeliaceae</td>
<td>E</td>
</tr>
</tbody>
</table>

Source: [http://www.plantatlas.usf.edu and 2009 Term Capital Improvements Environmental Assessment.](http://www.plantatlas.usf.edu)  

T = threatened, E = endangered
Wildlife

Based on information in the previous EAs, there are 23 state-listed wildlife species that could occur on or utilize the airport area. Table A-3 provides a list of both federal and state-listed wildlife species with the potential to occur in the airport vicinity. Federally-listed endangered and threatened species are discussed in a separate section of this appendix.

### Table A-3
FEDERAL AND STATE-LISTED WILDLIFE SPECIES WITHIN AIRPORT VICINITY

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>State Status</th>
<th>Federal Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mammals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florida black bear</td>
<td>Ursus americanus floridanus</td>
<td>ST</td>
<td></td>
</tr>
<tr>
<td>Florida mouse</td>
<td>Podomys floridanus</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Sherman's fox squirrel</td>
<td>Sciurus niger sharmani</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticolored heron</td>
<td>Egretta ticolor</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Snowy egret</td>
<td>Egretta thula</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Reddish egret</td>
<td>Egretta rufescens</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Little blue heron</td>
<td>Egretta caerulea</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>White ibis</td>
<td>Eudocimus albus</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Roseate Spoonbill</td>
<td>Ajaia Ajaia</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Limpkin</td>
<td>Aramus guarauna</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Wood stork</td>
<td>Mycteria americana</td>
<td>SE</td>
<td>E</td>
</tr>
<tr>
<td>American oyster catcher</td>
<td>Haematopus palliatus</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Florida scrub jay</td>
<td>Aphelocoma coerulescens</td>
<td>ST</td>
<td>T</td>
</tr>
<tr>
<td>Florida sandhill crane</td>
<td>Grus canadensis pratensis</td>
<td>ST</td>
<td></td>
</tr>
<tr>
<td>Least tern</td>
<td>Sterna antillaria</td>
<td>ST</td>
<td></td>
</tr>
<tr>
<td>Piping plover</td>
<td>Charadrius melodus</td>
<td>ST</td>
<td>T</td>
</tr>
<tr>
<td>Black Skimmer</td>
<td>Rynchops Niger</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Brown Pelican</td>
<td>Pelecanus occidentalis</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td><strong>Reptiles &amp; Amphibians</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American alligator</td>
<td>Alligator mississippiensis</td>
<td>SSC</td>
<td>T</td>
</tr>
<tr>
<td>Gopher Tortoise</td>
<td>Gopherus polyphemus</td>
<td>ST</td>
<td></td>
</tr>
<tr>
<td>Eastern indigo snake</td>
<td>Drymarchon corais couperi</td>
<td>ST</td>
<td>T</td>
</tr>
<tr>
<td>Florida Pine Snake</td>
<td>Pituophis melanoleucus mugitus</td>
<td>SSC</td>
<td></td>
</tr>
<tr>
<td>Gopher Frog</td>
<td>Rana capito</td>
<td>SSC</td>
<td></td>
</tr>
</tbody>
</table>

Source: 2009 Near Term Capital Improvements Environmental Assessment.

ST = state threatened, SE = state endangered, SSC = species of special concern, T = threatened, E = endangered
A variety of habitats, from wetlands to shrub lands, may be utilized by nesting birds protected under the Migratory Bird Treaty Act. Under the Migratory Bird Treaty Act of 1918:

“any migratory bird, any part, nest, or eggs of any such bird” is afforded protection from “any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export…”

As documented in the 2009 and 2012 EAs and still applicable to date, there is a potential for occurrence of species protected under the Migratory Bird Treaty Act within the airport area.

In combination with the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act provides protection to the recently federally and state de-listed bald eagle (Haliaeetus leucocephalus). Nine active bald eagle nests were documented in the 2009 EA with the closest approximately 3.2 miles away from the airport. No new bald eagle nests (since the time of the 2012 EA) have been reported or documented in the vicinity of the airport.

COASTAL BARRIERS

While Flagler County is a coastal Florida county, the airport property is not a part of any Coastal Barrier Resource System (CBRS). Both the U.S. Fish and Wildlife Service (USFWS) and the Federal Emergency Management Agency (FEMA) coastal barrier maps were reviewed to confirm this fact. In addition, the 2012 and 2009 EAs also document that the airport is not part of the CBRS.

COASTAL ZONE MANAGEMENT

Any future development projects that are determined to require an EA will also be coordinated with the Florida Department of Environmental Protection (FDEP) to determine if the project is consistent with the Florida Coastal Management Program.

COMPATIBLE LAND USE

Those future improvements which are entirely within the airport property should not cause or contribute to any off-airport land use changes. The compatibility of both existing and future land uses around an airport can however be affected by aircraft noise. At this time, it is not expected that any of the future improvements will
significantly change the type or increase the number of operations conducted at the airport.

**CONSTRUCTION**

Minimal environmental impacts may be created during the construction of airport improvement projects. However, these as well as any noise or dust due to delivery of materials through public streets will be temporary. Discharge of silt in the stormwater stream will be controlled by silt barriers and other appropriate measures, through compliance with applicable local, state, and federal regulations.

Construction equipment staging and storage areas are typically located within the airport property in areas not in conflict with aircraft operations. The provisions of FAA Advisory Circular (AC) 150/5370-10F, *Standards for Specifying Construction of Airports* will be incorporated into project plans and specifications. Specifically, Item P-156 “Temporary Air and Water Pollution, Soil Erosion, and Siltation Control,” will be applied to control any potential impacts.

Any jurisdictional wetland impacts that might result from a future construction project would be subject to all federal, state, and county laws, including any required mitigation. Likewise, all federal, state, and county permits required will be obtained for each project.

**SECTION 4(F)**

Section 4(f) of the Department of Transportation Act of 1966 states that a transportation project that requires the use of publicly-owned land of a park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance; or land of a historic site of national, state, or local significance may be approved. However, such approval is only granted if there are no reasonable alternatives to avoid the resources and that the project incorporates all possible elements to minimize impacts. A full Cultural Resource Assessment Survey (CRAS) of the airport property was conducted as part of the 2009 EA. The 2009 EA and related CRAS documented that there are no Section 4(f) lands within the airport property boundary.

**FEDERALLY-LISTED THREATENED AND ENDANGERED SPECIES**

As shown in Table A-4, there are five federally-listed species that could potentially occur in the vicinity of the airport property. There are three avian species and two reptilian species, each of which is addressed below.
TABLE A-4  
FEDERALLY-LISTED WILDLIFE SPECIES WITHIN AIRPORT VICINITY

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>State Status</th>
<th>Federal Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood stork</td>
<td>Mycteria americana</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Florida scrub jay</td>
<td>Aphelocoma coerulescens</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>Piping plover</td>
<td>Charadrius melodus</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>American alligator</td>
<td>Alligator mississippiensis</td>
<td>SSC</td>
<td>T</td>
</tr>
<tr>
<td>Eastern indigo snake</td>
<td>Drymarchon corais couperi</td>
<td>T</td>
<td>T</td>
</tr>
</tbody>
</table>

Source: 2009 Near Term Capital Improvements Environmental Assessment.  
ST = state threatened, SE = state endangered, SSC = species of special concern, T = threatened, E = endangered

Wood stork

The wood stork is the largest wading bird found within the U.S. Wood storks typically utilize shallow waters, including wetlands, coastal areas, ponds, ditches, creeks, and impounded water areas, for feeding on fish, amphibians, or small reptiles and mammals. Nesting typically occurs in cypress trees or mangroves within coastal and freshwater areas. This endangered species does not have critical habitat rules published under the Endangered Species Act. However, breeding colonies are tracked and documented by the USFWS and under their management guidelines for nesting colonies. For this region of the state, the core foraging area for a colony site is set at a radius of 13 miles. The 2009 EA documented that the airport is within the core foraging area of a documented wood stork colony site approximately 9.75 miles away. Since that time, no additional wood stork colony sites or core foraging areas have been documented in the airport area and no wood storks have been observed on the airport property.

Florida Scrub Jay

The Florida scrub jay utilizes specific types of upland scrub habitat within Florida: sand pine scrub, xeric oak scrub, and scrubby flatwoods. During field observations for the EA studies, no scrub jays or nests were observed. In fact, both the 2009 and 2012 EAs documented that there were no critical habitats for scrub jay on the airport property.

Piping Plover

The piping plover is a shorebird that utilizes sandy beaches for nesting within Florida. Main threats to this species include coastal development, human disturbance (crushing of eggs), pet disturbance (mainly flushing by dogs), and extreme tides that
impact nesting areas. The airport is located over four miles from the nearest sandy beach area. This species has a low probability of being present on a majority of the developed airfield due to lack of suitable habitat. As documented in the EA studies, there are no critical habitat areas designated for this species.

**American Alligator**

The American alligator is a listed as threatened due to its similarity in appearance to the threatened American Crocodile (Crocodylus acutus). The American alligator is commonly found throughout the State of Florida and utilizes water habitats for feeding and adjacent upland areas for nesting. However, the American crocodile’s range is limited to southern Florida and does not include the airport area. There have been documented sightings by airport personnel of American Alligators within Gore Lake, as well as the various canals and ponds on the airport. Due to this species ability to move long distances across uplands for breeding and foraging purposes, there is a moderate likelihood that this species could utilize some of the developable area within the airport property (mainly for traversing purposes). As documented in the EA studies, this species does not have designated critical habitat areas.

**Eastern Indigo Snake**

The eastern indigo snake is found from Florida to southern Georgia. It utilizes both upland and wetland habitats and is more closely associated with upland, well drained habitats that are utilized by gopher tortoises and other burrowing animals. Gopher tortoise and armadillo burrows, which may be utilized by indigo snakes, have been documented on airport property. Threats to the indigo snake include: habitat loss, habitat fragmentation, insecticide poisoning, and commercial collecting. Due to the lack of large territories and suitable habitat within the airport boundary, the likelihood of their occurrence is low. As documented in the EA studies, this species does not have designated critical habitat areas under the Endangered Species Act.

**ENERGY SUPPLIES, NATURAL RESOURCES, AND SUSTAINABLE DESIGN**

It is not expected that any of the future airport improvements will have an impact to energy supplies or natural resources. Temporary increases in demand for energy will be required for construction; however, this is considered minor and will not result in any negative or permanent impacts. Additionally, future airfield improvements will be designed to the extent possible to tie into existing airport systems and infrastructure. This helps ensure the continuation of sustainable systems for airport staff to maintain.
ENVIRONMENTAL JUSTICE

Environmental justice analysis considers the potential to cause disproportionate and adverse effects on low income or minority populations. Future improvements envisioned at the airport are not expected to result in any significant increase in aircraft operations, aircraft noise, or air quality degradation. As such, no affects to any individuals regardless of their race or income are expected.

FARMLANDS

The Farmland Protection Policy Act of 1984 provides the statutory framework for considering important farmlands in federal decisions. As documented in the 2009 EA, there are no farmlands which are considered prime or unique within the airport property boundary.

FLOODPLAINS

Floodplains are the lowlands and relatively flat areas adjoining inland and coastal waters that are prone to the 100-year (or 500-year) flood. These zones are identified on maps created by FEMA. Both EAs evaluated the most recent FEMA Flood Insurance Rate Map (July 17, 2006) for the airport area. A large portion of the airport area has been designated as within the 100-year floodplain (Zone A). This area is on the west side of the undeveloped airport property around Gore Lake. Review of the FEMA maps will determine what impacts a future project might have, if any, to the documented floodplains.

HAZARDOUS MATERIALS

As documented in the 2009 EA, a comprehensive search of the federal, state, and local databases was conducted to identify any hazardous materials information for the airport. This resulted in four known hazardous material generators or handlers being within one-half mile, to the northeast of the airfield. This area is off airport property along State Road (SR) 100. Based on a review of this information, no known sites were identified to exist within the airport property boundary. As such, future airport improvements are not anticipated to disturb or create any hazardous materials. Should any hazardous materials be discovered during construction, all work would stop and the appropriate measures taken to ensure compliance with applicable state and federal regulations.

As noted in the Construction section, the provisions of FAA AC 150/5370-10F, Standards for Specifying Construction of Airports will be incorporated into project plans and specifications. Specifically, Item P-156 “Temporary Air and Water Pollution, Soil Erosion, and Siltation Control,” will be applied to control any potential impacts. The refueling and required maintenance of construction equipment on site
will be conducted using appropriate BMPs as outlined in this guidance. Any spills or leaks that occur would be mitigated under the applicable procedures.

**HISTORICAL AND ARCHEOLOGICAL**

A Cultural Resource Assessment Survey (CRAS) was conducted for the entire airport property as part of the 2009 EA. This study was conducted pursuant to Section 106 of the National Historic Preservation Act (NHPA) of 1966 and its implementing regulations. CRAS analysis resulted in the identification of four cultural resources: the discovery of one new prehistoric site (8FL296); the re-evaluation and reclassification of a previously recorded prehistoric site (8FL33); an historic cemetery (8FL297); and the historic Bunnell Navy Airfield (8FL308). None of these sites were determined eligible for listing on the National Register for Historic Preservation. As documented in the 2009 EA, the Florida State Historic Preservation Officer concurred with these determinations in 2008.

As part of both EA studies, letters were sent to the recognized Native American Tribal entities with a history in the Flagler County area regarding the proposed projects of each study and the past CRAS analysis. No objection has been made from the Tribal entities in response to those letters; however, a letter was received from the Seminole Tribe of Florida as part of the 2012 EA requesting that they be informed if any cultural resources that are potentially ancestral or historically relevant are discovered at any point during the project. In the event that any cultural resources are discovered during future airport projects, all activities will immediately cease and the FAA, the Florida State Historic Preservation Officer, and all Tribal entities will be contacted regarding the appropriate course of action.

**INDUCED SOCIOECONOMIC**

The future improvements at the airport are not expected to result in any significant increase in aircraft operations, aircraft noise, or air quality degradation. As such, it is not anticipated that there will be any changes in the area’s population or growth; no changes to the surrounding community, no increases in the demand for public services, no impacts to local businesses, or effects on the area economy as a result of any future airport improvement project.

**LIGHT EMISSIONS AND VISUAL EFFECTS**

Any future improvements, changes, or expansion of runway edge, taxiway edge, or visual navigational aid lighting systems will be analyzed for their effect on the surrounding community. However, since these systems are typically on airport property due to their function, it is not anticipated that there will be any light emissions or visual effects that would impact the community since the airfield cannot be seen from any street, neighborhood, or otherwise public area.
NOISE

A noise analysis conducted as part of the 2009 EA showed that no significant aircraft noise impacts would occur to any off-airport incompatible land uses from the various improvements proposed in that study. Similarly, while it is not anticipated that any single future improvement will change the type or significantly increase the number of operations conducted at the airport, a new noise analysis may be required by the FAA as part of their environmental review for each project. Construction would result in localized increases in noise levels but these effects are considered minor and temporary in duration.

SOCIAL IMPACTS

The future improvements envisioned for the airport are not expected to result in any significant increase in aircraft operations, aircraft noise, or air quality degradation. As such, no human health or environmental effects are expected to any individuals in the community.

SOLID WASTE

Most airport construction projects will generate a limited amount of vegetative or even unwanted construction material debris. Although all three of the landfills in Flagler County are closed, the Tomoka Landfill just west of Daytona Beach has a life expectancy to 2030, has accepted this type of debris in the past, and is expected to in the future.

WATER QUALITY

As the lead agency responsible for state water quality standards, FDEP oversees permitting processes and the issuance of water quality certifications. Water management districts in Florida were delegated concurrent authority to issue, deny, or waive water quality certification. For Flagler County, the St. Johns River Water Management District (SJRWMD) has jurisdiction as the delegated authority. Issuance of a standard general, individual, or conceptual approval of environmental resource permits, and individual wetland resource permits issued by the SJRWMD constitute the granting of water quality certification and compliance with state and federal water quality standards, unless specifically stated differently in the permit.

The Flagler County Airport has a Master Stormwater Management Plan which was approved by SJRWMD. The current plan considers the impact of those projects identified on the 2006 Airport Layout Plan. While the stormwater plan provides a holistic approach to stormwater management (quantity and quality), many projects in this study will likely require additional stormwater management facilities. Given the amount of abandoned pavement from the original U.S. Navy airfield, future projects will include removing these unused areas in an effort to reduce any new impervious
areas that would require significant modification to existing stormwater treatment for water quality.

**WETLANDS**

Wetlands are defined as lowlands covered with shallow and sometimes temporary or intermittent waters. They include, but are not necessarily limited to the following: swamps, marshes, bogs, river overflows, and tidal overflows, as well as estuarine areas and shallow lakes and ponds with emergent vegetation. Typical wetland indicators include the presence of unique, saturated soils and vegetation adapted to or tolerant of saturated conditions.

Filling or disturbing wetlands for commercial development, public infrastructure, etc. are some of the regulated activities controlled by a permit review process administered by the U.S. Army Corp of Engineers (USACE). The USACE also enforces Executive Order 11990, Protection of Wetlands, which requires Federal agencies to avoid, to the extent possible, adverse impacts associated with the destruction or modification of wetlands.

During each EA, both SJRWMD and USACE were coordinated with to determine jurisdictional wetland lines for the various projects. The same will be required for any future projects with the potential to impact wetland areas. A review of previous wetland delineations, soil survey maps, aerial photos, and other reports were included as part of the alternatives analysis for future projects of this study in order to avoid or minimize future wetland impacts.

Mitigation measures will be conducted to offset direct and secondary impacts associated with any project that is determined by a formal review to impact wetlands. These measures might include providing offsite wetland mitigation on Flagler County owned property known as Parcel D. Parcel D is a 1,100 acre parcel of land that was acquired by the Flagler County Board of County Commissioners. This parcel was selected as a potential offsite mitigation area to enable the airport to minimize the potential for an increased hazardous wildlife attractants associated with on-airport wetland mitigation areas. Parcel D is over 10,000 feet from the airport operation area which meets separation criteria for hazardous wildlife attractants set forth in FAA AC 150/5200-33B *Hazardous Wildlife Attractants on or Near Airports*. Parcel D is within the same surface water basin as the airport, which is the Halifax River Basin.

An Off-Site Mitigation Feasibility Assessment was completed for Parcel D to determine the mitigation potential of the land. While the report showed the ability to provide mitigation options, the USACE and SJRWMD permitting process will formalize the exact mitigation needs required for future projects. The exact amount of mitigation required is subject to change as a result of new regulations or procedures resulting from the regulatory review process. In addition, Flagler County
has provided a “commitment letter” to the FAA stating their intention to use Parcel D for future airport mitigation purposes.

WILD AND SCENIC RIVERS

There are four federal agencies that manage and protect the National Wild and Scenic River System. The closest Wild and Scenic River to the Flagler County Airport is the Wekiva River which is primarily administered by the National Park Service. The closest point of this river is 45 miles to the southwest of the airport, so no impact will occur as a result of future airport improvements.

CUMULATIVE IMPACTS

Cumulative Impacts are impacts that a proposed project would have on a particular resource when added to impacts on that resource due to past, present, and reasonably foreseeable future actions within a defined time and geographical area. These include actions the airport undertakes itself as well as those of other public or private entities that need to be considered in the review. The potential for cumulative impacts will be evaluated for any future improvement project that is required to conduct an EA.
APPENDIX B

PROJECT DEFINITION STUDY
FOR POTENTIAL NEW PARALLEL RUNWAY
Project Definition Study for Potential New Parallel Runway
STUDY PURPOSE

The ongoing effort to update the Flagler County Airport master plan has documented the airfield’s existing capacity problem. Analyses in the master plan study confirm that a parallel runway system needs to be a priority of the short term planning period (2014 – 2018). While not shown on the current interim Airport Layout Plan (ALP), a parallel runway was proposed in the 1997 Airport Master Plan. A key difference from the previous recommendation is that the recent evaluation is based on actual airport traffic control tower (ATCT) counts versus estimates. It is also important to note that since 1997, there have been a significant amount of improvements and development at the airport. This and the continued growth in activity emphasize the importance of properly establishing the future airfield configuration as well as the corresponding landside facilities.

Two key elements that were beyond the effort anticipated in the master plan scope were identified to properly establish the best alternative. These included purchase and analysis of detailed flight data so that an accurate fleet mix could be established to formally justify the parallel runway length. Additionally, accurate environmental data had to be collected, which would primarily delineate and evaluate the wetland areas that exist in nearly every undeveloped portion of the airport.

The following sections document the runway length justification, environmental conditions, and parallel runway alternatives which will be referenced in the current airport master plan study and incorporated into the environmental assessment required for the parallel runway program. As such, all elements have been conducted in accordance with the applicable Federal Aviation Administration (FAA) and Florida Department of Transportation (FDOT) guidance.

ELEMENT 1 – RUNWAY LENGTH JUSTIFICATION

The analyses conducted as part of the current airport master plan resulted in a proposed parallel runway length of 5,000 feet. The master plan identifies that while a majority of the operations on the new parallel runway would be conducted by small aircraft, the runway would also be used by other aircraft, including jet aircraft greater than 12,500 pounds. Since the parallel runway is required for capacity, it must be capable of serving a majority of the aircraft that operate into and out of the Flagler County Airport on a regular basis. However, as stated previously, the master plan did not include evaluation of detailed data on the airport’s operational fleet mix. For any airport, ATCT counts do not include the type of aircraft conducting takeoffs or landings. The exception being those flights which have filed and were actually conducted with an instrument flight rule (IFR) flight plan.

IFR flight plans are managed by ATCTs through the use of flight progress strips. Aircraft and route information is printed on a piece of paper which controllers in the tower use to facilitate the flight. As required, the physical copies of these strips are only kept by the Flagler ATCT for 15 days and there is no historic archive of the data kept locally. Therefore, it is necessary to go to a third party if the detailed information of the flight progress strips is desired over a long period of time.
FlightAware Data

A record of the IFR flight plans between January 2011 and December 2013 was obtained from FlightAware. While this data just captures a fraction of the total operations conducted each year, it is the only source for the actual operational fleet mix and typically captures a high percentage of the larger more demanding aircraft operating at an airport. Each record in the data set includes the aircraft type; origin and destination; departure and arrival times; and owner information. **Table 1-1** provides an overview of the data collected.

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFR Departures</td>
<td>2,237</td>
<td>2,177</td>
<td>2,207</td>
</tr>
<tr>
<td>IFR Arrivals</td>
<td>1,466</td>
<td>1,453</td>
<td>1,512</td>
</tr>
<tr>
<td>Total Records</td>
<td>3,703</td>
<td>3,630</td>
<td>3,719</td>
</tr>
<tr>
<td>Total Annual Operations</td>
<td>176,309</td>
<td>153,585</td>
<td>164,027</td>
</tr>
<tr>
<td>Percent of Total Operations</td>
<td>2.1%</td>
<td>2.4%</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

Source: FlightAware and C&S Engineers, Inc.

Of the 11,052 records, 290 had the aircraft and owner information blocked. The figures above also show that for each year there was approximately 50 percent more departures than arrivals. This occurrence is likely due to aircraft operators canceling their IFR flight plan before landing or in some cases (as shown by the lack of an arrival time) the flight may not have been made. For these reasons, it is necessary to substantiate certain aspects of the flight records. Blocked records were eliminated as they could not provide any useful information for the analyses. Similarly, any records that did not include an actual arrival or departure time were eliminated. In addition, the individual aircraft identification numbers were utilized to identify duplicate entries in the data sets as well as to determine whether any specific aircraft only had a record of arriving or departing, but not both. The latter is significant for the more demanding aircraft, because in some instances there is no record of their arrival; but there is for their departure, which would only account for half of their operations.

After these adjustments were made, the FlightAware dataset was expanded to include the respective FAA Runway Design Code (RDC), maximum certificated takeoff weight (MTOW), aircraft category, published balanced field length, and FAA fleet designation (where applicable) for each aircraft type. Using this information, an extrapolation of the overall operational fleet mix was made by applying the percent each RDC was observed to the corresponding annual operations. While this does not create an exact count, the resulting numbers in **Table 1-2** do provide a reasonable estimate of the types of operations occurring each year.
TABLE 1-2
ESTIMATE OF OVERALL OPERATIONAL FLEET MIX

<table>
<thead>
<tr>
<th>Runway Design Code (RDC)</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-I</td>
<td>114,760</td>
<td>95,549</td>
<td>106,829</td>
</tr>
<tr>
<td>A-II</td>
<td>1,226</td>
<td>436</td>
<td>721</td>
</tr>
<tr>
<td>B-I</td>
<td>46,345</td>
<td>44,485</td>
<td>36,616</td>
</tr>
<tr>
<td>B-II</td>
<td>10,250</td>
<td>9,978</td>
<td>14,097</td>
</tr>
<tr>
<td>C-I</td>
<td>736</td>
<td>566</td>
<td>1,531</td>
</tr>
<tr>
<td>C-II</td>
<td>1,569</td>
<td>2,091</td>
<td>2,342</td>
</tr>
<tr>
<td>C-III</td>
<td>196</td>
<td>131</td>
<td>90</td>
</tr>
<tr>
<td>D-I</td>
<td>294</td>
<td>0</td>
<td>90</td>
</tr>
<tr>
<td>D-II</td>
<td>392</td>
<td>0</td>
<td>360</td>
</tr>
<tr>
<td>Rotorcraft</td>
<td>541</td>
<td>349</td>
<td>1,351</td>
</tr>
</tbody>
</table>

Total Operations 176,309 153,585 164,027

Source: C&S Engineers, Inc.

FAA Runway Length Calculations

The length required for the parallel runway was calculated using the five step procedure outlined in Chapter 1 of FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

*Step #1*

With the exception of the D-I and D-II categories in 2012, the types of aircraft in the FlightAware records are very consistent each year. This data supports the fleet mix assumptions included in the FAA approved forecasts of the current master plan study. The master plan projections show growth in the activity for all aircraft types throughout the 20-year planning period, including those most critical for runway length. Using only the records for 2013, these critical design aircraft include many of the popular medium sized business jets such as the Citation, Falcon, and Learjet series. This mix also includes some large turboprop models and a number of the larger business jet aircraft including the Challenger, Gulfstream, and Hawker series.

*Step #2*

The most critical design aircraft currently operating at the Flagler County Airport with respect to the runway length calculations fall within the following FAA categories:

- Large Turboprop (over 12,500 but less than 60,000 pounds)
- Large Jet (over 12,500 but less than 60,000 pounds)
- Heavy Jet (60,000 pounds or more)
Actual operations conducted by these aircraft in 2013 are included in Table 1-3 along with the information necessary to determine the appropriate FAA methodology for calculating the required parallel runway length.

<table>
<thead>
<tr>
<th>Type Code</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Runway Design Code (RDC)</th>
<th>Maximum Takeoff Weight (pounds)</th>
<th>Operations at Flagler in 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTR</td>
<td>IAI</td>
<td>Gulfstream G100</td>
<td>C-II</td>
<td>24,650</td>
<td>4</td>
</tr>
<tr>
<td>B350</td>
<td>Beechcraft</td>
<td>Super King Air 350</td>
<td>B-II</td>
<td>15,000</td>
<td>4</td>
</tr>
<tr>
<td>BE30</td>
<td>Beechcraft</td>
<td>Super King Air 300</td>
<td>B-II</td>
<td>14,000</td>
<td>4</td>
</tr>
<tr>
<td>BE40</td>
<td>Beechcraft</td>
<td>Beechjet</td>
<td>B-I</td>
<td>16,100</td>
<td>76</td>
</tr>
<tr>
<td>C25B</td>
<td>Cessna</td>
<td>Citation CJ3</td>
<td>B-II</td>
<td>13,870</td>
<td>10</td>
</tr>
<tr>
<td>C550</td>
<td>Cessna</td>
<td>Citation II</td>
<td>B-II</td>
<td>14,800</td>
<td>12</td>
</tr>
<tr>
<td>C551</td>
<td>Cessna</td>
<td>551 Citation 2SP</td>
<td>B-II</td>
<td>14,100</td>
<td>2</td>
</tr>
<tr>
<td>C560</td>
<td>Cessna</td>
<td>Citation V</td>
<td>B-II</td>
<td>15,900</td>
<td>54</td>
</tr>
<tr>
<td>C56X</td>
<td>Cessna</td>
<td>Citation Excel</td>
<td>B-II</td>
<td>18,700</td>
<td>110</td>
</tr>
<tr>
<td>C650</td>
<td>Cessna</td>
<td>Citation III</td>
<td>B-II</td>
<td>22,200</td>
<td>14</td>
</tr>
<tr>
<td>C680</td>
<td>Cessna</td>
<td>Citation Sovereign</td>
<td>B-II</td>
<td>30,000</td>
<td>22</td>
</tr>
<tr>
<td>C750</td>
<td>Cessna</td>
<td>Citation X</td>
<td>C-II</td>
<td>36,100</td>
<td>14</td>
</tr>
<tr>
<td>CL30</td>
<td>Bombardier</td>
<td>BD-100 Continental</td>
<td>C-II</td>
<td>38,500</td>
<td>48</td>
</tr>
<tr>
<td>CL60</td>
<td>Canadair</td>
<td>Challenger</td>
<td>C-II</td>
<td>41,250</td>
<td>6</td>
</tr>
<tr>
<td>E135</td>
<td>Embraer</td>
<td>ERJ-135</td>
<td>C-II</td>
<td>41,887</td>
<td>4</td>
</tr>
<tr>
<td>E55P</td>
<td>Embraer</td>
<td>Phenom 300</td>
<td>B-I</td>
<td>17,968</td>
<td>14</td>
</tr>
<tr>
<td>F2TH</td>
<td>Dassault</td>
<td>Falcon 2000</td>
<td>B-II</td>
<td>35,000</td>
<td>30</td>
</tr>
<tr>
<td>FA10</td>
<td>Dassault</td>
<td>Falcon 10</td>
<td>B-I</td>
<td>18,740</td>
<td>10</td>
</tr>
<tr>
<td>FA20</td>
<td>Dassault</td>
<td>Falcon 20</td>
<td>B-II</td>
<td>29,100</td>
<td>4</td>
</tr>
<tr>
<td>FA50</td>
<td>Dassault</td>
<td>Falcon 50</td>
<td>B-II</td>
<td>40,780</td>
<td>8</td>
</tr>
<tr>
<td>GALX</td>
<td>IAI</td>
<td>Gulfstream G200</td>
<td>C-II</td>
<td>34,850</td>
<td>4</td>
</tr>
<tr>
<td>GLEX</td>
<td>Bombardier</td>
<td>Global Express</td>
<td>C-III</td>
<td>91,000</td>
<td>4</td>
</tr>
<tr>
<td>GLF3</td>
<td>Gulfstream</td>
<td>Gulfstream 3</td>
<td>C-II</td>
<td>69,700</td>
<td>6</td>
</tr>
<tr>
<td>GLF4</td>
<td>Gulfstream</td>
<td>Gulfstream IV</td>
<td>D-II</td>
<td>71,780</td>
<td>14</td>
</tr>
<tr>
<td>H25B</td>
<td>Raytheon</td>
<td>Hawker 800</td>
<td>B-II</td>
<td>28,000</td>
<td>40</td>
</tr>
<tr>
<td>H25C</td>
<td>Raytheon</td>
<td>Hawker 1000</td>
<td>B-II</td>
<td>36,000</td>
<td>4</td>
</tr>
<tr>
<td>JS31</td>
<td>British Aerospace</td>
<td>Jetstream 31</td>
<td>B-II</td>
<td>15,212</td>
<td>20</td>
</tr>
<tr>
<td>LJ31</td>
<td>Learjet</td>
<td>31</td>
<td>C-I</td>
<td>16,500</td>
<td>12</td>
</tr>
<tr>
<td>LJ35</td>
<td>Learjet</td>
<td>35</td>
<td>D-I</td>
<td>18,300</td>
<td>2</td>
</tr>
<tr>
<td>LJ40</td>
<td>Learjet</td>
<td>40</td>
<td>C-I</td>
<td>20,350</td>
<td>6</td>
</tr>
<tr>
<td>LJ45</td>
<td>Learjet</td>
<td>45</td>
<td>C-I</td>
<td>20,500</td>
<td>6</td>
</tr>
<tr>
<td>LJ60</td>
<td>Learjet</td>
<td>60</td>
<td>C-I</td>
<td>23,500</td>
<td>10</td>
</tr>
<tr>
<td>WW24</td>
<td>IAI</td>
<td>1124 Westwind</td>
<td>C-I</td>
<td>23,500</td>
<td>18</td>
</tr>
</tbody>
</table>

Total Annual Operations (all aircraft) 596

Total Annual Operations (over 12,500 but less than 60,000 pounds) 572

Step #3

In 2013 only a few operations of aircraft with a MTOW greater than 60,000 pounds were documented (shown in gray). Therefore, the design approach applied for runway length calculations is based on those aircraft with a MTOW over 12,500 but less than 60,000 pounds. As shown in Table 1-3 this family grouping of aircraft conducted more than 500 annual itinerant operations in 2013, based on the IFR flight plans alone. The design guidelines for this group of aircraft are included in Chapter 3 of FAA AC 150/5325-4B.

Step #4

The different performance curves in Chapter 3 of the FAA AC require the airport elevation (33 feet above mean sea level) and the mean daily maximum temperature of the hottest month (91°F in both July and August). In addition, the curves are based on the FAA percentage of fleet and useful load factor.

Percentage of Fleet – Tables 3-1 and 3-2 of FAA AC 150/5325-4B split the 12,500 to 60,000 pound aircraft into the categories of 75 and 100 percent of the fleet. The critical aircraft group for the Flagler County Airport is made of aircraft from both of these categories. Even if relatively few aircraft fall within the 100 percent category, the guidance states that the performance curves for this group should be used to determine the runway length. Therefore, the performance curves for both the 75 and 100 percent of the fleet categories were analyzed.

Useful Load Factor – FAA performance curves are also provided for either a 60 or 90 percent useful load. These allow an estimate to be made of the typical amount of passengers, cargo, and fuel carried by the different aircraft within the two fleet categories. While actual weights of the aircraft during the flight are not included in the FlightAware data, the aircraft in the 12,500 to 60,000 pound group averaged an enroute flight time of 1 hour 28 minutes. Given the distances the majority of these aircraft can fly when fully loaded, it is not reasonable to assume most are operating at a 90 percent useful load, including those that may have ferried fuel into the Flagler County Airport to conduct multiple flight legs without refueling. For these reasons, only the 60 percent useful load was considered in this analysis.

Applying the factors above yields the initial, unadjusted runway lengths of 4,675 feet for 75 percent of the fleet and 5,450 feet for 100 percent of the fleet.

Step #5

To obtain the final recommended runway length, adjustments must be made to the lengths in Step #4 for either takeoff or landing operations, but not for both, as the increases cannot be cumulative. The takeoff adjustments are based on the effective gradient of the runway. At the Flagler County Airport the maximum difference in runway centerline elevation is 3.7 feet for Runway 11-29 and 3.2 feet for Runway 06-24; therefore, 4 feet was used in the adjustments. Landing adjustments are applicable to those runways that serve jet aircraft. When this is the case, the runway length needs to be increased by 15 percent to account for the decrease in landing performance under wet and slippery conditions. Table 1-4 reflects the resulting runway length requirements after adjustments for both the 75 and 100 percent fleet categories.
TABLE 1-4
LENGTHS REQUIRED FOR AIRCRAFT OVER 12,500 BUT LESS THAN 60,000 POUNDS

<table>
<thead>
<tr>
<th></th>
<th>60 Percent Useful Load</th>
<th>75 Percent of the Fleet</th>
<th>100 Percent of the Fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takeoff Operations</td>
<td>4,715'</td>
<td>5,490'</td>
<td></td>
</tr>
<tr>
<td>Landing Operations</td>
<td>5,376'</td>
<td>5,500'</td>
<td></td>
</tr>
</tbody>
</table>

Source: FAA AC 150/5325-4B (Figures 3-1 and 3-2).

Runway Length Analysis Using Balanced Field Length

The figures in Table 1-2 show that 96.5 to 98.0 percent of the annual operations over the past three years have been conducted by aircraft within the A-I to B-II range. This supports the current airport master plan recommendation for a B-II parallel runway, to provide capacity for a majority of the aircraft utilizing the airport. Therefore, another runway length analysis was conducted for only those aircraft in Table 1-3 with a RDC up to B-II. As shown in Table 1-5 and described below, the balanced field lengths published for each of these aircraft were adjusted to local conditions for comparison to the FAA methodology.

TABLE 1-5
BALANCED FIELD LENGTHS FOR LARGE AIRCRAFT UP TO RDC B-II

<table>
<thead>
<tr>
<th>Type Code</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Runway Design Code (RDC)</th>
<th>Balanced Field Length (feet)</th>
<th>Length Required at Flagler (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B350</td>
<td>Beechcraft</td>
<td>Super King Air 350</td>
<td>B-II</td>
<td>3,300</td>
<td>3,879</td>
</tr>
<tr>
<td>BE30</td>
<td>Beechcraft</td>
<td>Super King Air 300</td>
<td>B-II</td>
<td>3,950</td>
<td>4,635</td>
</tr>
<tr>
<td>BE40</td>
<td>Beechcraft</td>
<td>Beechjet</td>
<td>B-I</td>
<td>4,290</td>
<td>5,030</td>
</tr>
<tr>
<td>C25B</td>
<td>Cessna</td>
<td>Citation CJ3</td>
<td>B-II</td>
<td>3,440</td>
<td>4,042</td>
</tr>
<tr>
<td>C550</td>
<td>Cessna</td>
<td>Citation II</td>
<td>B-II</td>
<td>3,600</td>
<td>4,228</td>
</tr>
<tr>
<td>C551</td>
<td>Cessna</td>
<td>551 Citation 2SP</td>
<td>B-II</td>
<td>3,450</td>
<td>4,053</td>
</tr>
<tr>
<td>C560</td>
<td>Cessna</td>
<td>Citation V</td>
<td>B-II</td>
<td>3,160</td>
<td>3,716</td>
</tr>
<tr>
<td>C56X</td>
<td>Cessna</td>
<td>Citation Excel</td>
<td>B-II</td>
<td>3,415</td>
<td>4,013</td>
</tr>
<tr>
<td>C650</td>
<td>Cessna</td>
<td>Citation III</td>
<td>B-II</td>
<td>5,150</td>
<td>6,031</td>
</tr>
<tr>
<td>C680</td>
<td>Cessna</td>
<td>Citation Sovereign</td>
<td>B-II</td>
<td>3,694</td>
<td>4,337</td>
</tr>
<tr>
<td>E55P</td>
<td>Embraer</td>
<td>Phenom 300</td>
<td>B-I</td>
<td>3,138</td>
<td>3,690</td>
</tr>
<tr>
<td>F2TH</td>
<td>Dassault</td>
<td>Falcon 2000</td>
<td>B-II</td>
<td>5,815</td>
<td>6,804</td>
</tr>
<tr>
<td>FA10</td>
<td>Dassault</td>
<td>Falcon 10</td>
<td>B-I</td>
<td>4,500</td>
<td>5,275</td>
</tr>
<tr>
<td>FA20</td>
<td>Dassault</td>
<td>Falcon 20</td>
<td>B-II</td>
<td>5,820</td>
<td>6,810</td>
</tr>
<tr>
<td>FA50</td>
<td>Dassault</td>
<td>Falcon 50</td>
<td>B-II</td>
<td>5,200</td>
<td>6,089</td>
</tr>
<tr>
<td>H25B</td>
<td>Raytheon</td>
<td>Hawker 800</td>
<td>B-II</td>
<td>5,380</td>
<td>6,298</td>
</tr>
<tr>
<td>H25C</td>
<td>Raytheon</td>
<td>Hawker 1000</td>
<td>B-II</td>
<td>5,250</td>
<td>6,147</td>
</tr>
<tr>
<td>JS31</td>
<td>British Aerospace</td>
<td>Jetstream 31</td>
<td>B-II</td>
<td>3,900</td>
<td>4,577</td>
</tr>
</tbody>
</table>

Average Runway Length Required at the Flagler County Airport  4,981

Source: Aircraft manufacturers, industry databases, and aircraft performance manuals.
The balanced field length is the takeoff distance published by the manufacturers of each aircraft using standard atmospheric conditions (59°F at sea level) on a flat and dry runway. Because the airport elevation at the Flagler County Airport is only 33 feet above mean sea level, these values can be considered, but only as a best case scenario, as local temperatures are rarely around 59°F. In fact, while Flagler County occasionally experiences 59°F and even lower temperatures, these typically only occur at night during a few months of the year.

The lengths identified for Flagler have been adjusted based on the local airport elevation, mean daily maximum temperature of the hottest month, and maximum difference in runway centerline elevation. In all cases these lengths are longer primarily due to the area’s climate.

**Justified Length for the Parallel Runway**

The runway lengths in Table 1-4 that have been adjusted for landing operations are not necessarily required for the parallel runway. As defined by the FAA, this adjustment is only applicable for turbojet-powered aircraft landing on a runway during ‘wet and slippery’ conditions. While the airport has a significant number of jet aircraft operations and the area does experience rainy conditions year round (average annual rainfall of 49 inches), the parallel runway is a secondary runway only needed for capacity during visual flight rule (VFR) conditions.

It is also documented that the airport serves a significant amount of training traffic. Therefore, while the parallel runway would have to accommodate a majority of the aircraft fleet operating at the airport, it is not required for it to duplicate the instrument capability of the primary runway, for the largest aircraft operating at the Flagler County Airport. Furthermore, during rainy conditions (even if still VFR) it is safe to assume that the overall activity would not be at the typical levels requiring the additional runway capacity.

Consequently, only the runway lengths in Table 1-4 that have been adjusted for takeoff operations would be applicable to the parallel runway requirements. At 60 percent useful load, these lengths averaged 5,103 feet. Similarly, the adjusted balanced field lengths in Table 1-5 resulted in an average runway length of 4,981 feet. When both methodologies are considered, the future parallel runway at the Flagler County Airport should have a length of 5,000 feet. This length is just under that justified by the FAA methodology and would accommodate a majority of the current aircraft operational fleet as well as those expected for at least the next five years. Correspondence regarding the review of this element by the FAA and FDOT is included at the end of this study.

**ELEMENT 2 – ENVIRONMENTAL DATA**

Prior to the evaluation of any parallel runway alignments, information on the extent, quality, and status of wetland areas on and immediately surrounding the airport was compiled. This effort included researching all available environmental documentation, permits, and wetland surveys, as well as conducting field work to delineate, evaluate, and document current site conditions. Existing and publically available data was obtained from relevant state and federal agencies.

The wetland areas were field verified and delineated in accordance with 62-340 FAC (Florida
Project Definition Study for Potential New Parallel Runway
Flagler County Airport

Administrative Code) and the 1987 Department of the Army Corps of Engineers (ACOE) Wetland Delineation Manual and Regional Supplements. These features were recorded using global positioning systems (GPS) for use with the airport mapping and various environmental data sets. In addition, functional assessments of the identified wetland habitats were conducted to evaluate the extent of potential impacts to wetland communities and document any occurrence of state and/or federally listed species. Functional assessments were conducted using Florida’s Uniform Mitigation Assessment Methodology (UMAM) which is the sole means for determining wetland function pursuant to 62-345 FAC and is the methodology accepted for evaluation by the ACOE in Florida.

This study did not include a jurisdictional determination from the St. Johns River Water Management District (SJRWMD) to officially bind the wetland delineation for a period of five years. However, the results of the field work and mapping were coordinated with SJRWMD for concurrence on the wetland delineation. This concurrence resulted in the establishment of the wetland limits shown on Figure 2-1 and will be used to evaluate the various parallel runway options and alternatives.

In the following section, the wetland information was used to provide a general comparison of potential impact areas under each of the initial parallel runway options. For the final analysis, the functional values of the wetland habitats within the limits of the three refined alternatives were evaluated. This allowed both the quantity and quality of wetlands and other habitats to be established for each.

ELEMENT 3 – PARALLEL RUNWAY ALTERNATIVES

Initial options for the proposed parallel runway were identified in the ongoing effort to update the Flagler County Airport master plan. It is entirely possible for the new parallel runway to be orientated to either the current Runway 11-29 or Runway 06-24 alignment. As documented in the master plan update, this is primarily due to the seasonal winds as well as how the airfield flow is managed by the ATCT. The initial options were categorized in four groups:

- Group 1 – South of Relocated Runway 11-29
- Group 2 – Southeast of Runway 06-24
- Group 3 – Northwest of Runway 06-24
- Group 4 – Current Runway 11-29 Alignment

In addition to the required 5,000 foot length, each option provides the criteria for FAA Runway Design Code (RDC) B-II with non-precision instrument approaches (not lower than one mile visibility minimums) planned to both ends. However, it should be noted that while instrument approaches are planned, the future parallel runway would not be designated as an instrument departure runway. Therefore, no instrument departure surfaces are required.
The RDC and instrument approaches require a runway width of 75 feet with 10 foot stabilized shoulders. The runway will also require 95 foot wide by 150 foot long paved blast pads at each end since it will be used by small to medium sized jet aircraft. The primary design requirements (which are shown in green around each proposed parallel runway) include the following surfaces:

- Runway Safety Area (RSA): 150’ wide and 300’ beyond each runway end
- Runway Object Free Area (ROFA): 500’ wide and 300’ beyond each runway end
- Runway Protection Zone (RPZ): 500’ inner width, 700’ outer width, and 1,000’ long

A minimum runway centerline spacing of 700 feet is required to allow simultaneous Visual Flight Rules (VFR) operations. In addition, each initial option included a basic taxiway system layout to illustrate how the proposed parallel runway might tie into the existing and future airfield facilities. This includes the ability to enable Design Group III aircraft to move unrestricted along any taxiways associated with the proposed parallel runway, without impacting runway operations.

**Group 1 – South of Relocated Runway 11-29**

The only options for a parallel runway system using the Runway 11-29 alignment would be to the south of the current runway centerline. This is simply due to the fact that a majority of the airport facilities are located north of the current Runway 11-29 alignment and the proximity of the north airport property boundary. Because a project to relocate Runway 11-29 to the south is currently under design, the first group looks at constructing the parallel runway south of the future Runway 11-29 centerline. A derivative of this option is included in Group 4.

**Option 1a**

Proposed parallel runway offset 700 feet to the south of the relocated Runway 11-29 with the Runway 11 thresholds aligned (Figure 3-1a).

**Option 1b**

Proposed parallel runway offset 700 feet to the south of the relocated Runway 11-29 with the Runway 29 thresholds aligned (Figure 3-1b).

Options 1a and 1b differ only by which end of the new parallel runway would be aligned with a threshold of the relocated Runway 11-29. As illustrated and quantified in Table 3-1, the key comparison between the two is the amount of environmental impact. The only existing airfield facility that either option would impact would be the Automated Weather Observing System (AWOS), as it would lie within the ROFA of the parallel runway.
Group 2 – Southeast of Runway 06-24

While different obstacles exist, it would be possible to construct a parallel runway to either side of the Runway 06-24 alignment. The second group looks at the options to construct a new parallel runway on the southeast side of the Runway 06-24 centerline.

Option 2a

Proposed parallel runway offset 700 feet to the southeast of Runway 06-24. Since both runways are 5,000 feet long, the thresholds at each end are aligned (Figure 3-2a).

Option 2b

Proposed parallel runway offset 1,875 feet to the southeast of Runway 06-24 with both thresholds aligned (Figure 3-2b). This option originated from the ongoing master plan and has been reconsidered given adjustments to the Runway 11-29 relocation project and changes in the airport property line since that time.

Option 2c

Proposed parallel runway offset 2,250 feet to the southeast of Runway 06-24 with both thresholds aligned (Figure 3-2c). This option attempts to eliminate the non-compatible issue created by the required RPZ off the future Runway 06R end overlapping the south access road.

Option 2a illustrates that with only a 700 foot offset to the southeast, the new parallel runway and its associated surfaces would directly impact the ATCT and new south access road. This option also creates an intersection with the relocation of Runway 11-29 that would recreate a “hot spot” nearly identical to the one the airport is currently working to eliminate. Taxiway access to the Runway 24L end would also be confusing and potentially create another “hot spot.”

Options 2b and 2C offer a safer operating environment by not creating any new “hot spots” and minimizing the direct impact to existing facilities. With respect to existing airport impacts, the primary difference between the two is that Option 2C would not require the south access road to be relocated. Both Options 2b and 2c would impact the recently permitted retention pond on the south side of the airport, but also have the ability to create a new flightline for aviation related development between the runway and south access road.
Group 3 – Northwest of Runway 06-24

The third group looks at the options of constructing a new parallel runway on the northwest side of the Runway 06-24 centerline.

Option 3a

Proposed parallel runway offset 700 feet to the northwest of Runway 06-24. Since both runways are 5,000 feet long, the thresholds at each end are aligned (Figure 3-3a).

Option 3b

Proposed parallel runway offset 825 feet to the northwest of Runway 06-24. Since both runways are 5,000 feet long, the thresholds at each end are aligned (Figure 3-3b). The additional 125 foot offset allows Taxiway E to be used for both runways.

Option 3c

Proposed parallel runway offset 1,325 feet to the northwest of Runway 06-24. Since both runways are 5,000 feet long, the thresholds at each end are aligned (Figure 3-3c).

All of the options in Group 3 would have an impact on existing airport facilities. With the minimum 700 foot offset, Option 3a would directly impact Taxiway E and all of the facilities around the east aircraft parking apron. Under this option the on-airport cell tower would penetrate the future transitional surface of the proposed parallel runway by more than 100 feet. In addition, Option 3a would also impact the AWOS as well as the historic cemetery located just north of the southwest end of Taxiway E. For Option 3b, the impact to Taxiway E is eliminated; however the other impacts described for Option 3a would remain.

Option 3c attempts to eliminate the impacts to existing facilities by shifting the parallel runway even further to the northwest. With an offset of 1,325 feet, the only impact to the facilities of the east aircraft parking apron would be the landside access. Therefore under this option a new road would have to be established from the east, around the approach to the existing Runway 24 threshold. The 1,325 foot offset would also eliminate the impact to the AWOS and most likely the historic cemetery, although the exact limits of this site (8FL297) are not documented. Option 3c would still impact the on-airport cell tower and create a new impact to at least a portion of the corporate aircraft parking apron. Additionally, the proposed runway under Option 3c would require at least two acres of land to be acquired on the north side to accommodate the future ROFA. This land acquisition could be avoided if the proposed runway was shifted to the southwest; however, doing so would then require a portion of Gore Lake to be filled to provide the proper RSA on the Runway 06L end.
Group 4 – Current Runway 11-29 Alignment

As the primary instrument runway, the current project to relocate Runway 11-29 is being designed to accommodate RDC C-II and eventually C-III aircraft with precision approach capability. One of the main reasons this runway is being relocated 400 feet south of the current alignment is to provide the required setbacks and critical surfaces. However, when the design began, there was no thought of a parallel runway since one was not included in the last master plan or the most recent interim ALP. Regardless, an option group which utilizes the current Runway 11-29 alignment for the new parallel runway has been considered. The concept is that the smaller setbacks and critical surfaces of RDC B-II could be accommodated utilizing a portion of the current Runway 11-29 pavement structure. The larger primary instrument runway surfaces would then be located further south (700 feet) than the original 400 foot shift.

Under this scenario, two possibilities have been included for comparison with the other initial options. In both, the proposed parallel runway has been configured along the existing Runway 11-29 pavement surface, but 52.5 feet south of the current centerline. Since the existing pavement would have to be reconstructed for the new runway profile, this offset allows the required 75 foot width of a B-II runway, including the 10 foot stabilized shoulders, to remain within the limits of the current pavement structure. More important, this offset would allow a new full length parallel taxiway to be constructed along the north side with a centerline offset of 300 feet. As with the other options groups, this offset enables Design Group III aircraft to move unrestricted along the taxiway without impacting runway operations. Additionally, the required Design Group III Taxiway Object Free Area (TOFA) would not overlap the recently reconstructed primary aircraft and new corporate aircraft parking aprons.

Option 4a

Proposed parallel runway located along the south edge of the current Runway 11-29 alignment and the primary instrument Runway 11-29 offset 700 feet south. The Runway 11 end thresholds are aligned on the west side of the runways (Figure 3-4a).

Option 4b

Proposed parallel runway located along the south edge of the current Runway 11-29 alignment and the primary instrument Runway 11-29 offset 700 feet south. In this option the parallel runway has been shifted 500 feet east to align the Runway 29 thresholds and improve the intersection with the Runway 24 threshold (Figure 3-4b).

There are a number of iterations possible for this parallel runway group. For each, the only airport facility that would be directly impacted would be the AWOS. However, as shown in Option 4a, the critical issue within this group is how the proposed parallel runway would intersect the Runway 24 threshold. In essence, this option group cannot avoid replicating the “hot spot” that is being eliminated by the current Runway 11-29 relocation project. In Option 4b the new parallel runway has been shifted to the east as much as possible, while still keeping the RPZ on airport property. This 500 foot shift somewhat improves the intersection with Runway 06-24, but does not allow the north parallel taxiway to connect to the Runway 29R threshold.
Evaluation of Initial Options

The initial options were compared using criteria specifically selected to determine which would have the best potential for being considered in the final evaluation. The screening criteria for this comparison are described in the following sections and summarized in Table 3-1. For every option the required airport design standards would be met, even if they required land acquisition, facility relocation, and/or mitigation of impacted features.

**Airfield Construction Costs**

Order of magnitude cost estimates were calculated for each initial option so that a general comparison of the construction expenses could be made. These costs only included the preliminary estimates associated with the construction of the proposed parallel runway and taxiway system. While these costs considered such items as the grading, paving, drainage, electrical, and markings associated with each option, they did not include the costs for any impacts to existing airport facilities, or environmental mitigation. It is worth noting that the costs for Options 4a and 4b should not be directly compared to the others. The reason being that under this group, some of the costs would have to be included in the project to relocate Runway 11-29, since that project would occur first.

**Wetland Impact Areas**

Due to the characteristics of the Flagler County Airport property, every parallel runway option will have both direct and secondary wetland impacts. During the refined alternatives analysis, these specific impacts will be calculated based on the quantity and quality of wetlands and habitats within the associated areas. However, for the initial options, only the general wetland areas associated with the direct and secondary wetland impacts have been included. The areas that would need to be cleared and/or graded to provide the proper drainage, ATCT line of sight, or appropriate runway visibility zone have not been included at this point. The direct wetland impact areas shown in Table 3-1 include those areas of the proposed runway and parallel taxiway construction, safety areas, and object free areas. Only those portions of the associated RPZs have been included for the estimate of secondary wetland impact areas, since these areas would have to be cleared for the corresponding approach surface.

**Other Environmental Considerations**

There are three conservation easements on the west side of the Flagler County Airport which have been established with the SJRWMD. Table 3-1 denotes which of the proposed parallel runway options would impact these areas; however, as with the wetland areas, the specific impact will only be evaluated for those options retained in the refined alternatives analysis.

As noted previously, there is a historic cemetery (site 8FL297) located just north of the southwest end of Taxiway E. This cemetery, which belongs to the White family, was addressed in the 2009 Near Term Capital Improvements Environmental Assessment for the Flagler County Airport. In that study the Florida Department of State Division of Historical Resources documents that insufficient information is available to evaluate the extents of the White cemetery. However, the final recommendation was that a buffer zone around the known “folk
graves” be preserved to protect any unmarked human remains from disturbance. Therefore, those options with the potential to impact site 8FL297 have been noted in Table 3-1.

There are also two prehistoric sites on the Flagler County Airport property which have been documented in past environmental studies. Site 8FL296 is south of the existing Runway 06-24 alignment, situated at what use to be the end of one of the abandoned runways (pavement since removed). The other (site 8FL33) is north of Runway 06-24 at the southwest end of Taxiway E. While both of these sites are near the options associated with Groups 2 and 3, they are no longer considered significant. The Florida Department of State Division of Historical Resources (in a letter dated July 14, 2008 to the FAA) determined that both prehistoric archaeological sites 8FL296 and 8FL33 were not eligible for listing on the National Register of Historic Places “due to loss of integrity from previous disturbances.”

*Ability to Provide Safe and Efficient Taxiway Access*

An important consideration is whether an option has the ability to provide both safe and efficient taxiway access. A full length parallel taxiway has been included for each parallel runway option. While some of these preliminary taxiway layouts may not reflect the most efficient or final arrangement, they serve to illustrate and evaluate each option’s potential for tying into the ultimate airfield configuration. Development of the preferred taxiway layouts will only be made for those options included in the refined alternatives analysis.

*Existing Airport Facilities Impacted*

Both the aviation and non-aviation facilities impacted by each option have been listed in Table 3-1. The associated costs to relocate or mitigate the impacted facilities will only be calculated for the options in the refined alternatives analysis. However, the list of impacted facilities does show which options have the greatest potential for increased costs, project complexity, construction phasing, and time required to complete the improvements.

*Required Land Acquisition*

The need to require land for any of the options has also been noted in Table 3-1. Much like the impact to existing facilities, a requirement for additional land will have both cost and time considerations for the proposed parallel runway project.

*Selected Parallel Runway Options*

The single best option from each of Groups 1, 2, and 3 were retained for the refined alternatives analysis. For Group 1, Option 1b was retained as it had less airfield construction costs and a smaller environmental footprint. In Group 2, while Option 2c did not have the lowest initial costs or wetland impact area; it was the only one that did not have significant impacts to existing airport facilities. Therefore it was included as one of the final alternatives. Similarly, Option 3c did not have the lowest construction cost or amount of wetland impact area, but it did have the least impact to existing airport facilities. Option 3c was also the only one in its group that would avoid impacting the historic cemetery.
TABLE 3-1
COMPARISON OF INITIAL OPTIONS

<table>
<thead>
<tr>
<th></th>
<th>Option 1a</th>
<th>Option 1b</th>
<th>Option 2a</th>
<th>Option 2b</th>
<th>Option 2c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airfield Construction Costs – Order of Magnitude (millions)</td>
<td>$9.76</td>
<td>$9.10</td>
<td>$8.12</td>
<td>$8.63</td>
<td>$8.86</td>
</tr>
<tr>
<td>Wetland Impact Areas Direct (acreage)</td>
<td>16.89</td>
<td>11.57</td>
<td>9.52</td>
<td>37.90</td>
<td>39.61</td>
</tr>
<tr>
<td>Wetland Impact Areas Secondary (acreage)</td>
<td>14.99</td>
<td>15.20</td>
<td>10.21</td>
<td>10.84</td>
<td>8.63</td>
</tr>
<tr>
<td>Other Environmental Considerations</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Ability to Provide Safe and Efficient Taxiway Access</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Existing Airport Facilities Impacted</td>
<td>AWOS</td>
<td>AWOS</td>
<td>Access Road ATCT</td>
<td>Access Road</td>
<td>None</td>
</tr>
<tr>
<td>Required Land Acquisition</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Option 3a</th>
<th>Option 3b</th>
<th>Option 3c</th>
<th>Option 4a</th>
<th>Option 4b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airfield Construction Costs – Order of Magnitude (millions)</td>
<td>$7.49</td>
<td>$4.88</td>
<td>$5.33</td>
<td>$7.34</td>
<td>$7.00</td>
</tr>
<tr>
<td>Wetland Impact Areas Direct (acreage)</td>
<td>12.28</td>
<td>13.76</td>
<td>29.00</td>
<td>19.19</td>
<td>20.23</td>
</tr>
<tr>
<td>Wetland Impact Areas Secondary (acreage)</td>
<td>7.23</td>
<td>4.12</td>
<td>10.29</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other Environmental Considerations</td>
<td>Conservation Easement &amp; Cemetery</td>
<td>Conservation Easement &amp; Cemetery</td>
<td>Conservation Easement</td>
<td>Conservation Easement</td>
<td>Conservation Easement</td>
</tr>
<tr>
<td>Ability to Provide Safe and Efficient Taxiway Access</td>
<td>Limited</td>
<td>Limited</td>
<td>Limited</td>
<td>No</td>
<td>Limited</td>
</tr>
<tr>
<td>Existing Airport Facilities Impacted</td>
<td>AWOS, Cell Tower &amp; East Facilities</td>
<td>AWOS, Cell Tower &amp; East Facilities</td>
<td>Cell Tower, Access Road &amp; A/C Apron</td>
<td>AWOS</td>
<td>AWOS</td>
</tr>
<tr>
<td>Required Land Acquisition</td>
<td>None</td>
<td>None</td>
<td>± 2 acres</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

Options 4a and 4b were not retained for the refined alternatives analysis. While these provided the ability to consider a “what if” scenario, the fact remains that there are too many drawbacks associated with the particular configuration of this group. At first glance, these options seem viable given their airfield cost estimates and wetland impact areas. However, as stated previously, this is somewhat misleading since switching the location of the two parallel runways would significantly change the current project to relocate the larger primary instrument runway. Under such a scenario, the construction and environmental costs associated with the current project to relocate Runway 11-29 would increase; hence the lower costs/impacts of the proposed project...
parallel for capacity purposes. In fact, if either Options 4a or 4b were to be considered, the entire project to relocate the primary instrument runway would have to start over since it would be in an entirely different location than what was evaluated in the 2009 environmental assessment and currently under design. Finally, while worth evaluating, none of the options under Group 4 could provide safe and efficient taxiway access due to the proximity of the Runway 24 threshold.

Refined Alternatives

Some adjustments and additional features were added to Options 1b, 2c, and 3c for the final alternatives analysis. For each the ultimate ends of the relocated Runway 11-29 were included along with the corresponding Future Runway Visibility Zone (FRVZ). Combined with the required ATCT line of sight, the FRVZ will enable each alternative to be compared with respect to any additional clearing. It should be noted that the ultimate FRVZ does not differ too much from that required of the initial relocated Runway 11-29 at 5,500 feet. And since it is not known if the primary runway would be extended prior to the construction of a parallel runway, the ultimate FRVZ was included for all three final alternatives.

The refined alternatives also include the 95 foot wide by 150 foot long paved blast pads that are required at each end since the parallel runway will be used by small to medium sized jet aircraft. However, the ten foot runway shoulders are not shown as they only need to be stabilized, not paved. Each also includes a run-up area at both ends of the proposed parallel runway. The FAA recommends providing holding bays or run-up areas when runway operations reach a level of 30 operations per hour. As documented in the ongoing airport master plan, the Flagler County Airport conducted up to 78 operations during the peak hour in 2012. The designated run-up areas shown have been generally sized to provide space for two to three Design Group I aircraft (wingspans up to 49 feet). They have also been configured to allow at least Design Group II aircraft (wingspans up to 79 feet) to have the proper wingtip clearance to bypass aircraft in the run-up areas.

Layout of the parallel and connector taxiways have also been modified. For each this includes at least two taxiway exits meeting the appropriate criteria to maximize the exit factor and therefore capacity of the runway system. Capacity calculations in the ongoing effort to update the Flagler County Airport master plan show the exit factor range is 2,000 feet to 4,000 feet from the landing threshold and that each exit must be separated by at least 750 feet. While three taxiways could be properly configured within the exit range for each end, this would not increase the hourly capacity under the FAA methodology. In addition, too many connector taxiways within the 2,000 foot range creates too many intersections within a short span of a 5,000 foot runway.
Refined Alternative 1

The first refined alternative retains the same geometry of Option 1b, where the proposed parallel runway is offset 700 feet south of the relocated Runway 11-29 with the Runway 29 thresholds aligned. The primary difference is that the parallel taxiway which was initially between the two runways has been removed. It has been replaced with two partial parallel taxiways on the south side of the proposed parallel runway (Figure 3-5a). The revised configuration would provide better separation of the traffic utilizing the two runways, including any run-up operations by the piston powered aircraft. This layout also has a slightly smaller footprint with respect to the wetland areas that would be directly impacted by the taxiway construction. The figure does not show the required relocation of the AWOS.

Refined Alternative 2

The second refined alternative utilizes the same parallel runway offset of 2,250 feet to the southeast of Runway 06-24 as shown in Option 2c. One of the primary differences under this analysis relates to the impact of the FRVZ. As shown in Figure 3-5b, the ultimate FRVZ would encompass a large portion of the potentially developable infield area between the parallel runways. This area significantly increases the secondary wetland impact area due to the clearing requirements of the FRVZ.

Refined Alternative 3

The third refined alternative maintains the proposed parallel runway offset of 1,325 feet to the northwest of Runway 06-24, with the thresholds aligned as in Option 3c. The key difference is the addition of a full length parallel taxiway on the northeast side to improve the safety and efficiency of aircraft ground movements. As shown on Figure 3-5c, the alternative also includes the land acquisition and new access road alignment that would be required for the east aircraft parking apron facilities. The figure does not show the relocations required for the impacts to the corporate aircraft parking apron or on-airport cell tower.
Comparison of Final Parallel Runway Alternatives

Similar factors to those considered for the initial options were included in the final alternatives analysis. However, as described in the following sections, a higher level of detail was included for those which fall under the topics of probable costs, environmental impact, or effect on the surrounding community.

Probable Construction Costs

Estimates of the probable construction costs were calculated using the layout drawings of the final three alternatives with existing airport topography data. Specific quantities for the amount of clearing, grubbing, excavation, and borrow were calculated for the site preparation. The revised layouts also allowed more accurate estimates of the base course and pavement required to be made, including the amounts of prime coat, tack coat, and joint sealing materials needed. Costs were also calculated for the drainage systems that would be necessary to properly accommodate the new impervious surfaces with the existing airport drainage systems and basins. More precise runway marking, lighting, navigational aids costs were added, including detail on the varying requirements for cable, trenching, duct work, handholes, cans, light fixtures, and signage. Each includes estimates for mobilization, maintenance of traffic, survey, and an overall factor for contingencies. While the estimates did include costs associated with the clearing and grading, no estimates were included for the environmental mitigation that would be required for each of the three alternatives. Specific environmental impacts and the resulting costs are addressed in the next section.

The probable construction costs are shown in Table 3-2. As expected, there is a difference when these costs are compared with those of the corresponding initial option order of magnitude costs in Table 3-1. For Refined Alternative 1, the cost is actually less. This is primarily related to the fact that there would be less taxiway construction over what was originally considered in Option 1b. For Refined Alternative 2, the costs are significantly higher than those for Option 2c. The main difference is that the probable costs include all of the excavation, borrow, and drainage system costs that would be required of constructing a runway in the southeast corner of the airport, to include replacing a portion of East Pond 2. Costs for Refined Alternative 3 more than doubled due to the inclusion of a full length parallel taxiway, the required land acquisition, and new access road, as well as the relocations of the corporate aircraft parking apron and on-airport cell tower.

Environmental Impact

Using the environmental data collected as part of this study, the functional values of the wetland habitats within the limits of three final alternatives were evaluated using the UMAM methodology to evaluate the amount of mitigation required for impacts to wetlands within the state of Florida. Demonstration of avoidance and minimization of wetland impacts is required prior to discussing mitigation. This UMAM assessment was conducted to compare the functional wetland loss for each alternative and identify the alternative with the least significant impacts. This significance determination includes evaluation of the amount of mitigation credits required to offset each of the proposed alternatives.
Due to the site conditions and the prevalence of wetland habitats at the Flagler County Airport, avoidance of wetland impacts is not possible. As such, minimization of impacts, based upon both quantity and quality of wetlands, has been evaluated and the results presented in Table 3-2. As shown on Figures 3-5a, 3-5b, and 3-5c, all three of the final alternatives have impacts to wetlands, though the extent and quality of impacts varies. The mitigation cost estimates are based upon an average valuation of mitigation bank credit pricing (in and out of the impact watershed basin), the credit availability, and demand for credits, which impacts credit pricing. Mitigation costs do not include costs to replace lost infrastructure, such as stormwater ponds, and assumes no wetland mitigation will be required for impacts to other surface waters such as ditches or stormwater ponds.

Of the final three alternatives, Refined Alternative 1 has the least significant impacts to wetlands. The 9.19 acres of direct and 17.86 acres of secondary impacts result in a total estimated functional loss of 10.63 units. As such, this alternative minimizes impacts through its location close to existing airfield facilities and impacts to wetlands that have been previously altered or affected by airport development.

Refined Alternative 2 has the largest impact areas with 43.84 acres of direct and 40.97 acres of secondary wetland impacts. The secondary impacts result from the requirement to sever large contiguous wetlands in the new infield area that must be cleared of vegetation for the ATCT line of sight and FRVZ. The mitigation required to offset this alternative is greater than the two other alternatives (34.12 functional loss units). In addition to the mitigation required, this alternative requires relocation of some exiting stormwater management features (ponds, conveyances) that would be directly impacted.

Refined Alternative 3 has 38.01 acres of direct and 18.04 acres of secondary impacts, but the majority of impacts are to wetlands that have been previously impacted by airport development. The wetlands impacted by this alternative are mostly moderate in functionality, but the acreage is significant when compared with Refined Alternative 1. As a result, the functional loss (31.64 units) and therefore mitigation required for this alternative is less than Refined Alternative 2, but more than Refined Alternative 1.

**Effect on the Surrounding Community**

For each final alternative, the potential impact the proposed runway configuration might have on the surrounding community was evaluated. Such impacts would generally be in the form of aircraft overflights, but can also include other off airport impacts associated with the required airspace surfaces, light emissions, or land acquisitions.

**Flight Patterns and Flow** – Flight patterns are established for every runway to facilitate the flow of both arriving and departing aircraft. A standard flight pattern consists of four legs which form a rectangular area on the left or pilot’s side of the active runway. When in a standard flight pattern, the first leg extends upwind along the extended runway centerline for one half nautical mile beyond the departure end of the runway. At that point, the aircraft makes a 90 degree left turn onto the crosswind leg. After one half nautical mile, the aircraft then turns 90 degrees left to the downwind leg, which is parallel to the runway centerline. After flying one half nautical mile beyond the landing threshold of the runway, the third 90 degree left turn is made to the base leg.
The final approach is then made after the last 90 degree left turn is made back onto the runway heading.

Currently the Flagler County Airport has standard flight patterns established to each runway end. This will not change as a result of the project to relocate Runway 11-29. However, for parallel runways at any airport, the standard traffic patterns must be established to the outside of the runways’ alignments. With parallel runways, the standard patterns would include turns to the right for one of the two runways, depending on the direction of use. The standard traffic patterns and the area they encompass around the airport for the relocated Runway 11-29 and Runway 06-24 configuration are shown in each of the four sections of Figure 3-6. The expanded flight pattern that would occur as a result of the different parallel runway options is also shown.

Since each proposed parallel runway would effectively replace the standard traffic on the side of the runway it is parallel to, the actual areas encompassed by these patterns do not change significantly. However, for Refined Alternatives 2 and 3 the areas would include more residential areas, whereas for Refined Alternative 1, the new area would only overlap undeveloped land that is not zoned for future residential use. Because the parallel runway is needed for capacity, airport activity will increase under any alternative, including if a parallel runway is not constructed. Therefore, while no noise analyses have been included as part of this evaluation, it is safe to say that for any option, the addition of a parallel runway would allow this expected increase in aircraft activity to be more evenly distributed around the immediate airport area. A noise analysis will be required as part of the formal environmental assessment for the selected parallel runway program.

It should also be noted that while only the flight patterns around each potential runway configuration are shown in Figure 3-6, there are still times when aircraft will utilize a path either straight-in or straight-out from the active runway. These arrivals and departures are typically associated with the larger aircraft that are not performing local operations at the airport such as flight training. Because the Flagler County Airport is surrounded on all side by residential development, each option will continue to have overflights of the surrounding community. What needs to be pointed out is that in Refined Alternative 2, flights departing straight-out on the proposed Runway 06R or arriving straight-in on the proposed Runway 24L would fly directly over the Old Kings Elementary School located south of SR 100 and east of Interstate 95 on Old Kings Road. Similarly, flights departing straight-out on the proposed Runway 06L or arriving straight-in on the proposed Runway 24R of Refined Alternative 3 would fly directly over the Florida Hospital Flagler campus located to the northeast of the airport, just north of SR 100. In both cases, these are not typically considered compatible land uses within a new flight corridor and would be a subject of the full environmental assessment required for such a project.
**Required Airspace Surfaces** – For each alternative, a number of airspace surfaces would have to be protected for the proposed parallel runway. With respect to the surrounding community, the most critical is that required for the instrument approach surface since no instrument departure surfaces would apply to the parallel runway. The required approach surfaces begin 200 feet beyond the paved runway threshold and extend out 10,000 feet at a slope of 34:1 to an outer width of 3,500 feet. This is based on the plan to ultimately provide non-precision approaches with not lower than one mile visibility standards. Since no obstructions should exist within the limits of the approach surface, the most critical is the inner portion, which nearly coincides with the RPZs shown on Figures 3-5a, 3-5b, and 3-5c. These areas would require most of the trees and/or vegetation to be cleared and hence the reason they were included in the environmental impact analysis. While some portion of the inner approach surfaces extends beyond the current airport property for all three final alternatives, none overlap any existing development. In each alternative no acquisition of land would be required, but it may be necessary to negotiate some agreements to mitigate off airport obstructions.

**Light Emissions** – The proposed parallel runway project would include edge lights for the runway and taxiway pavements, as well as Precision Approach Path Indicator (PAPI) systems and Runway End Identification Lights (REIL) for each runway end. However, since these lighting systems are well within airport property for all of the final alternatives, they cannot be seen from any street, neighborhood, or otherwise public area. Therefore, no light emissions or visual impacts on the surrounding community are expected.

**Requirement for Land Acquisition** - Only Refined Alternative 3 would require land to be acquired. In the original version of this alternative (Option 3c), a minimum of two acres was required to accommodate the future ROFA that would extend off airport property. However, Refined Alternative 3 includes a full length parallel taxiway on the northwest side. The run-up area and TOFA associated with the north end of this taxiway would increase the original land requirement to a minimum of three acres. Additionally, the proposed alignment shown for the new access road into the east aircraft parking apron facilities would require approximately 3.3 acres of land. At this time there is no development within the ±6.3 acres required for Refined Alternative 3.

For each of the final alternatives, a small portion of the associated RPZs would extend beyond the current airport property boundary. It should be noted that the airport is not required to own the land that lies within the RPZs off each runway end. However, the land may need to be acquired for the selected parallel runway alternative if any portion of the new RPZs overlap an incompatible land use as defined by the FAA in the September 2012 Interim Guidance on Land Uses Within a Runway Protection Zone. Currently all of the off-airport portions of the proposed RPZs only overlap undeveloped land. This could certainly change depending on when the selected parallel runway program is constructed, the land uses at that time, and/or any requirements by the agencies funding the project.
### TABLE 3-2
**COMPARISON OF FINAL ALTERNATIVES**

<table>
<thead>
<tr>
<th></th>
<th>Refined Alternative 1</th>
<th>Refined Alternative 2</th>
<th>Refined Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Probable Construction Cost (millions)</strong></td>
<td>$7.83</td>
<td>$14.27</td>
<td>$13.34</td>
</tr>
<tr>
<td>Existing Airport</td>
<td>AWOS</td>
<td>None</td>
<td>AWOS, Access</td>
</tr>
<tr>
<td>Facilities Impacted</td>
<td></td>
<td></td>
<td>Road &amp; A/C Apron</td>
</tr>
<tr>
<td><strong>Environmental Impacts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Wetland Impacts (acres)</td>
<td>9.19</td>
<td>43.84</td>
<td>38.01</td>
</tr>
<tr>
<td>Secondary Wetland Impacts (acres)</td>
<td>17.86</td>
<td>40.97</td>
<td>18.04</td>
</tr>
<tr>
<td>Functional Units Lost</td>
<td>10.63</td>
<td>34.12</td>
<td>31.64</td>
</tr>
<tr>
<td><strong>Mitigation Costs (millions)</strong></td>
<td>$1.17</td>
<td>$3.75</td>
<td>$3.48</td>
</tr>
<tr>
<td><strong>Effect on the Surrounding Community</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Area Encompassed by Standard Flight Patterns</td>
<td>59 acres</td>
<td>415 acres</td>
<td>123 acres</td>
</tr>
<tr>
<td>Required Airspace Surfaces</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Light Emissions</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Requirement for Land Acquisition</td>
<td>None</td>
<td>None</td>
<td>±6.3 acres</td>
</tr>
<tr>
<td><strong>TOTAL PROJECT COSTS (millions)</strong></td>
<td><strong>$9.00</strong></td>
<td><strong>$18.02</strong></td>
<td><strong>$16.82</strong></td>
</tr>
</tbody>
</table>

Source: C&S Engineers, Inc.

**Selected Parallel Runway Alternative**

Given the above evaluations, Refined Alternative 1 has been selected as the preferred parallel runway project for the Flagler County Airport. The resulting runway and taxiway configuration under this alternative will serve as the foundation for the new ALP drawing set being developed as part of the ongoing airport master plan study.
APPENDIX C

PROJECT COORDINATION
AIRPORT ADVISORY BOARD
MEETING MINUTES
Flagler County Chamber of Commerce - Flagler Room
February 14, 2013 - 4:00 p.m.

MEMBERS PRESENT: Mr. Robert Hanson, Mr. Gordon Heritage, Mr. Victor Natiello, Mr. Brian Riehle.
MEMBERS ABSENT: Mr. James Brown.
STAFF PRESENT: Ms. Julie Deily, Ms. Sally Sherman, Mr. Roy Sieger.
STAFF ABSENT: None
OTHERS PRESENT: Mr. Doug DiCarlo, C&S Companies, Mr. Jack Thompson, C&S Companies, Mr. Greg Upton/ATCT Manager.

1. After the Pledge of Allegiance, Chairman Heritage called the meeting to order at 4:00 pm.

2. The Chairman asked for approval of the January 10th meeting minutes. A motion was made to approve these minutes which was seconded so the motion carried.

3. The Chairman mentioned a recent newspaper article commending the Flagler County Airport staff for their good working relationship with the National Transportation Safety Board in regard to the recent airplane accident in Palm Coast. He then asked for the next item, Mr. Sieger's project update.

4. Mr. Sieger referred all to his report which outlined the following:

Project Updates
- The construction of the South Entrance Road is complete with the contractor preparing the as-builts for project closeouts.
- The final design of Runway 06-24 Runway Safety Area Improvements project is complete. The permit application was submitted to the St. John's River Water Management District (SJRWMD). SJRWMD has been to the airport to confirm wetland delineation lines, with the sub-consultant, Biological Consultants. A Request for Additional Information (RAI) has been received and Hoyle Tanner & Associates (HTA) is in the process of responding to it
- No change: Evaluation of options to limit the impacts of the landfill at the west end of the Runway 11-29 Relocation and Extension project are ongoing.
- The Airport Master Plan Update - Working Paper 1 will be presented at today's Airport Advisory Board (AAB) meeting following the Airport Director's brief. The presentation will also address the Master Plan process and future deliverables that the AAB will see. The next part of the Master Plan to be developed is Working Paper 2 which includes Capacity Assessment and Facility Requirements.
- The replacement of the Automated Weather Observation Station (AWOS) is substantially complete. A Change Order has been processed and a Supplemental Joint Participation Agreement (JPA) has been received from FDOT to fund the replacement backup altimeter required by the FAA. The equipment was installed today. Chairman Heritage asked if the FAA needed to inspect the installation? That's a good question, replied Mr. Sieger, saying it was calibrated on installation so he wasn’t certain but would check.
- A schematic design review meeting was held on February 12th for the Taxiway C & D Rehabilitation - Design project. After this meeting, preliminary design will proceed and the design plans and specifications will be further developed.
- Mr. Sieger concluded by saying next month’s report would be even shorter with three projects completed. One new project is the Design for Taxiway E; a JPA for this project should be received soon.
Fuel Sales
Fuel sales went up with Avgas increasing from 5500 gallons in December to almost 8500 in January. Jet A went from 8000 to nearly 9700 gallons last month, the highest January total in three years.

5. Air Traffic Control Tower Manager Comments
Mr. Upton said a Runway Safety Action Team meeting was required annually so he went forward with that. The main purpose of this meeting is to discuss runway incursions and none were reported. Last year there were a few hot spots but these were mostly taken care of; the only two areas of concern are the apex of the runways and Taxiway E intersection with Runway 29. These areas could present problems but usually don’t. Mr. Upton asked all attending to sign the meeting roster. He then reported that aircraft operations were up in January and should continue to increase.

6. Airport Master Plan Working Paper No. 1 Presentation
The next item on the agenda was an update on the Airport Master Plan, said Mr. Sieger, who then introduced Mr. Jack Thompson, the principal consultant at C&S Engineers responsible for this project. Mr. Thompson said his company had worked on several other projects here and were now working on updating the Airport Master Plan. He introduced Mr. Doug DiCarlo, the airport planner putting together this plan update. Mr. DiCarlo gave a brief overview of the project then went into detail. A copy of the presentation will be made part of these minutes. The floor was opened up for questions after the presentation. Mr. Riehle asked if there were any long range plans concerning noise abatement? Mr. Sieger said this master plan doesn’t address noise issues; that would require a Part 150 noise study. The ATCT is actually key to controlling the pattern to avoid nearby neighborhoods, said Mr. Thompson. Mr. Hanson wanted to compliment Mr. DiCarlo on his presentation, asking if the master plan would address any changes to the seaplane base on Gore Lake to which Mr. DiCarlo said no. Mr. Natiello asked how did Mr. DiCarlo know the number of airplanes based at the Airport; that is documented by the Airport office, replied Mr. DiCarlo. He mentioned the FAA Based Aircraft system, saying that database doesn’t count military, ultralight or experimental aircraft, and also doesn’t include airplanes reported at more than one airport. This duplicate airplane issue is a system flaw the FAA is aware of, said Mr. Thompson, which the FAA acknowledges doesn’t provide an accurate count. Is the master plan update only aviation related or are other commercial operations included, asked Mr. Natiello? Aviation is the main focus, replied Mr. DiCarlo, but other businesses are also addressed. Mr. Natiello then asked if the update would address discrepancies in the Airport’s Minimum Standards? No, said Mr. Sieger, that is for the County Attorney to handle. Chairman Heritage asked about instrument ILS approaches to which Mr. DiCarlo replied ILS approaches were expensive to maintain and would probably not be installed at this Airport.

7. Questions/Comments/New Business
Chairman Heritage asked if there were any questions, comments or new business from AAB members or staff. Mr. Hanson remarked that as his appointment was up this might be his last meeting. Ms. Sherman said there should be no issue with either Mr. Hanson’s or Mr. Natiello’s reappointment to the AAB.

7. Tenant Comments
The Chairman said that with no tenants here, there would be no comments or questions.

8. Adjournment was called for at 5:00 pm.
February 21, 2013

Mr. LeRoy W. Sieger, Jr.
Airport Director
Flagler County Airport
201 Airport Road
Palm Coast, Florida 32164

Dear Mr. Sieger,

RE: Flagler County Airport, Bunnel, Florida
Approval of Airport Master Plan Forecast

This letter responds to the Airport Master Plan Forecast forwarded under your consultant’s February 21, 2013 letter of transmittal. The forecasts depicted in the summary table, Table 3-12, are approved for use in your on-going master planning efforts. Please be advised any federal participation in airport development projects will be based on actual operations at the time of application for federal funds.

If you have any questions, please feel free to contact me at (407) 812-6331, ext. 122.

Sincerely,

ORIGINAL SIGNED BY

Rebecca R. Henry
Planning Specialist

cc: Jack Thompson, C&S Companies, Orlando
AIRPORT ADVISORY BOARD
MEETING MINUTES

Flagler County Airport – East Flight Training Facility
June 13, 2013 – 4:00 p.m.

MEMBERS PRESENT: Mr. James Brown, Mr. Robert Hanson, Mr. Gordon Heritage, Mr. Victor Natiello, Mr. Brian Riehle.
MEMBERS ABSENT: None.
STAFF PRESENT: Ms. Julie Deily, Ms. Sally Sherman, Mr. Roy Sieger.
STAFF ABSENT: None.
OTHERS PRESENT: Mr. Douglas DiCarlo (Guest), Mr. Jack Thompson (C&S Companies), Mr. Greg Upton (ATCT Mgr).

1. After the Pledge of Allegiance, Chairman Heritage called the meeting to order at 4:00 pm.

2. The Chairman asked for approval of the May 9th meeting minutes. A motion was made to approve these minutes which were seconded so the motion carried.

3. The Chairman said he had no comments and then asked for the next item, Mr. Sieger’s project update.

4. Mr. Sieger said he first wanted to thank the Advisory Board members that attended the last Board of County Commissioners meeting where he received the Southern Region General Aviation Manager of the Year from the Federal Aviation Administration. He then mentioned another award recently given to Ms. Sherman by the Florida City and County Management Association, naming her as the outstanding Deputy County Administrator for 2013. Board members offered Ms. Sherman their congratulations. Mr. Sieger then referred all to his report, which outlined the following:

Project Updates
- The permit from the St. John’s Water Management District (SJR WMD) for the Design of Runway 06-24 Runway Safety Area (RSA) Improvements project has been received; should also be receiving the permit from the Army Corps of Engineers shortly as well. The bid advertisement for the construction portion of this project was sent out on May 29th. A pre-bid meeting was held on June 7th. All bids must be submitted on or before July 3rd at 3:00 p.m. The bid opening will commence shortly after the bid closing. Mr. Sieger also said the Airport had just received a 100% funded Supplemental Joint Participation Agreement from the FL Department of Transportation (FDOT) in the amount of $1.5 million; $1 million for mitigation and $500,000 for construction.
- Evaluation of options to limit the impacts of the landfill at the west end of the Runway 11-29 Relocation and Extension project are ongoing. There have been several meetings in May and June with FAA and FDOT representatives to discuss various options. Mr. Natiello asked for clarification on the landfill location with Mr. Sieger saying it was on the approach end of the current runway location; the impact is on the runway safety area not the new runway location.
- Working Paper 2 for the Airport Master Plan Update has been submitted for review and comment and will be presented at the June AAB meeting. The Working Paper includes the airport capacity assessment, facility requirements and several airfield options. The land use research portion of the report has been conducted and a report was submitted to the Airport for review.
• The Preliminary Design review was conducted for the Taxiway C & D Rehabilitation project. Based on the review discussion, the Draft Construction Safety Phasing Plan was revised and submitted to the FAA for review.
• The Notice to Proceed was issued to C&S Companies on May 20th to start the Design for the Rehabilitation of Taxiway E. The survey and geotechnical investigations are underway.

Mr. Sieger concluded by saying there are no current construction projects, everything is in the design phase. He did anticipate RSA construction beginning soon after the bids were evaluated. Chairman Heritage asked if Mr. Sieger could provide any additional information on the possible Airport leases previously mentioned? Mr. Sieger said negotiations were still underway but perhaps in 30-45 days there might be more to report.

Fuel Sales
In May, Jet A fuel sales were down from April sales but still sold 10,000 gallons. Avgas sales were up 1,000 gallons in May versus April.

5. ATCT Manager Comments
Referring to the Air Traffic Control Tower operations chart, Mr. Sieger said that one area being addressed in the Airport Master Plan update is operational capacity. May saw an increase in operations to 14,766; overall this is a 6% increase over the same time last year. Mr. Upton said he had no other comments; the ATCT continues to operate smoothly.

6. Airport Master Plan Working Paper No. 2 Presentation
Mr. Sieger introduced the two guests at the meeting: Mr. Douglas DiCarlo, the airport planner preparing the Airport Master Plan Update (AMP), and Mr. Jack Thompson of C&S Companies, the engineering consultant firm handling the project. (A copy of Mr. DiCarlo’s presentation is made part of these minutes.)

7. Questions/Comments/New Business
Chairman Heritage asked if there were any questions, comments or new business from AAB members or staff. Mr. Hanson said he was out of town when Mr. Sieger’s award was given at the last BoCC meeting and regretted not being able to attend; he said he was proud to be associated with the Airport and offered his congratulations to both Mr. Sieger and Ms. Sherman. Next Mr. Natiello said in checking with residents of the “E” section that noise issues there had improved. He then asked if there were any new tenants on the cell phone tower since there was a new tower owner? Mr. Sieger replied that as with the previous owner, the airport did not control adding tenants to the tower but AT&T had added equipment so that brings in more revenue. According to Ms. Sherman, there is quite a bit of competition in the community for cell towers so that could be why no additional tenants have been secured.

8. Tenant Comments
The Chairman said that with no tenants in attendance, there could be no comments/questions.

9. With no further questions or comments, adjournment was called for at 5:06 pm.
Flagler County Board of County Commissioners
Workshop
(Followed by a Special Meeting of the Flagler County Board of County Commissioners for Any Action)

Emergency Operations Center, Building 3
1769 E. Moody Blvd., Bunnell, FL 32110

Monday, April 7, 2014
at 1:00 p.m.

AGENDA

1. Call to Order

2. Pledge to the Flag and Moment of Silence

3. Welcome: Flagler County Board Chair

4. Wadsworth Skateboard Rule Changes Discussion – Craig Coffey, County Administrator

5. Airport Master Plan Update – Roy Seiger, Airport Director

6. Medicaid Changes for Public Transportation – Heidi Petito, General Services Director

7. Adjournment

While this is a workshop only and no decisions are expected to be made by any of the governmental bodies, if a person decides to appeal any matter that may be discussed for a future proceeding, a record of the workshop may be needed and, for such purposes, the person may need to ensure that a verbatim record of the workshop is made.
FLAGLER COUNTY BOARD OF COUNTY COMMISSIONERS

APRIL 7, 2014

WORKSHOP

Present: Chairman George Hanns, Vice Chair Frank Meeker, Commissioners Barbara Revels, Nate McLaughlin and Charles Erickson, Clerk Gail Wadsworth, County Administrator Craig Coffey, Deputy County Attorney Kate Stangle, and Deputy Clerk Andrew Moss.

Chairman Hanns called the meeting to order at approximately 1:07 p.m. in the Emergency Operations Center in Bunnell, Florida.

ITEM 1 : CALL TO ORDER

Chairman Hanns called the meeting to order.

ITEM 2 : PLEDGE TO THE FLAG AND MOMENT OF SILENCE

Chairman Hanns led the Pledge to the Flag and requested a moment of silence.

ITEM 3 : PUBLIC COMMENT

Chairman Hanns requested public comment. There was none.

ITEM 4 : WADSWORTH SKATEBOARD RULE CHANGES DISCUSSION : CRAIG COFFEY, COUNTY ADMINISTRATOR

County Administrator Coffey proposed rule changes for the Wadsworth Skate Park. He mentioned they were not looking for action in regards to this item, just some direction. He included a proposed ordinance (on file in the Clerk's Office).

Tom Gillin, City of Flagler Beach Recreation Director, explained the big issue was the inclusion of bicycles on the equipment at the skate park, stating he had not seen any additional injuries relating to skateboarder/bicyclist crashes.

Commissioner Erickson responded he did not believe bikes and boards would have harmony on the same equipment, stating bikes moved faster than the boards and it was not a good mixture.

Commissioner McLaughlin asked about the hierarchy of use.

Mr. Gillin stated the kids at the park did a really good job co-existing and self-governing the use of the equipment.

County Administrator Coffey mentioned an e-mail the County received from a party who was upset about the mixture of bikes and boards.
(Item 4 - continued)

Captain Doughney, City of Flagler Beach Police Department, mentioned an autistic child who could not ride a skateboard due to balance issues so he rode a kick scooter instead, but since the child was not riding a skateboard he was asked to leave even though he had all the proper safety equipment. He noted this initiative was focused on safety.

Commissioner Meeker stated he could understand adding the kick scooters and inline skates, but questioned adding bikes to the mix. He asked if there was some facility size recommendation or guideline with regards to the freestyle bikes. Stated he was not against freestyle biking but was not sure they would be adequately supported by the size of the skate park.

Captain Doughney explained Operation Skate Safe. Stated there would be a fifty dollar fine for those who used the park without a helmet and rather than have a parent pay a one hundred dollar ticket the parent would pay fifty dollars and then get a helmet.

Commissioner Meeker wanted to ask the City of Flagler Beach if it thought there was sufficient space for the bikes.

Heidi Petito, General Services Director, stated she spoke with representatives from Skatewave and they believed there was sufficient room for the bikes and boards to co-mingle, noting there was a lot of free space because some equipment has been removed for one reason or another and never replaced. She mentioned rust was one of the reasons some equipment was missing and she believed a concrete park would be proactive.

Captain Doughney stated providing space for the kids to play on equipment that was designed for such use was important and his concern was not what the kids were riding, but that they were riding safely.

Chairman Hanns mentioned it appeared that Flagler Beach and the County must be doing a good job maintaining the park, since he has not heard anything negative about the park since it opened. Mentioned a lot of the traffic at Wadsworth Skate Park was from Palm Coast and wondered why the City of Palm Coast had not added a skate park.

County Administrator Coffey stated there was a smaller skate park in Palm Coast at Ralph Carter Park and it seemed like there has been a mix of different riders there as well.

Chairman Hanns requested public comments.

Brian Kopec, Palm Coast, spoke in opposition of the including bikes at the Wadsworth Skate Park. Stated the park had fallen into a state of disrepair and was covered in graffiti and smelled of urine. He mentioned the park did not look anything like it did when it opened, noting that 30%-40% of the equipment had been removed and never replaced. He applauded the Captain Doughney’s efforts with the helmet program, but felt strongly that bikes should not be included.
(Item 4 - continued)

Rachel Kopec echoed her husband’s opinion in regards to allowing bikes at the skate park. She also mentioned having to take a child to the hospital due to second and third degree burns because the metal ramps were not properly maintained, noting it should be a concrete park.

Commissioner Revels asked if there was space available to add a bike half-pipe feature at any of the bike parks.

County Administrator Coffey responded staff had looked at possibly doing something like that at Graham Swamp by adding a pump track which was like a mini mountain biking experience.

Commissioner McLaughlin interjected that was for mountain biking and BMX biking was completely different.

Further discussion ensued.

County Administrator Coffey offered to work on a project and bring it back to the BCC.

There was BCC consensus to have administration bring proposals at a later date.
ITEM 5 - AIRPORT MASTER PLAN UPDATE: ROY SIEGER, AIRPORT DIRECTOR

Roy Sieger, Airport Director, explained he had reached his five-year mark as the airport director and then gave an overview outlining airport projects that were completed in the previous five years as well as current and future projects. He provided a handout (on file in the Clerk's Office) which showed the costs associated with past, present and future airport projects.

He advised the airport master plan had been put on hold to conduct a new study called “Project Definition Study for a Potential New Runway.” Stated the purpose of the new project was to find the best location for a future parallel runway.

Doug DiCarlo, C&S Companies, gave a presentation (on file in the Clerk's Office) which explained different options relating to the future parallel runway’s location. He noted the surrounding wetlands as well as the types of aircrafts that visited the airport were the two main drivers of the options being presented. He explained the master plan was put on hold to explore capacity issues, noting they were currently over 60% and further stated the FAA recommended beginning the process of increasing capacity once an airport hit 60%. He proposed a new parallel runway, stating it would increase capacity. He explained the 60% threshold only included operations that occurred while the tower was open. Advised the County airport was the busiest of its kind in the state of Florida and the third busiest in the country. Stated some of the options would not be feasible, but had to be fully vetted, and each option had different unique costs. Stated staff would finalize a few options and bring them forward at a later date.

He also advised having the designation of being a foreign trade zone could attract businesses, noting the airport held that designation and would simply need to activate it. He further stated the airport was an “alternative” airport and would like the FAA designate it a “ reliever” airport.

Mr. Sieger suggested changing the airport identifier from XFL to FIN, stating he thought FIN was better, citing the X identifier was more rural than business friendly. He also proposed changing the name from “Flagler County Airport” to “Flagler Executive Airport”, which he believed would let people know that Flagler County was “open for business.”

There was BCC consensus to allow the change to FIN.

Chairman Hanns requested public comment.

Gordon Heritage, Chairman of the Airport Advisory Board, noted different aeronautical charts were updated on a 56 day cycle.

There was no other public comment.
ITEM 6 - MEDICAID CHANGES FOR PUBLIC TRANSPORTATION - HEIDI PETITO, GENERAL SERVICES DIRECTOR

Heidi Petito, General Services Director, gave a presentation (on file in the Clerk’s Office) regarding the recent changes to Medicaid as it related to public transportation. She advised the County’s current contract expired in June and recommended the contract not be renewed. She stated the County already lost money annually under the current contract and would lose almost another $32,000 per year with the changes, and the amount of time to get reimbursed was also going to increase greatly.

She explained some counties have already dropped out, while others have passed resolutions urging the state to delay changes to the current system. She stated other counties were having the discussion as they were now as to what to do next.

Advised even if the County lets the contract expire transportation would still be provided to the disadvantaged and elderly through public funds and it could provide transportation to Medicaid clients at their own expense by charging a $2 co-pay.

Commissioner Revels felt this was another issue where the state was getting involved and basically asking the County to do more with less, similar to unfunded mandates. She stated the BCC should do as other counties have done and tell the state this would not be tolerated.

Commissioner McLaughlin stated it appeared if the County renewed the contract it would lose approximately $32,000, but not renewing would cost the County $115,000.

Ms. Petito responded the County was not currently using its other revenue sources to their full potential. She further stated the County would not really lose any money, rather shift its current funding sources.

Commissioner Revels proposed the BCC also forward a resolution to the Governor explaining how there were problems in the community who were being left without a way to get medical treatment because the state had inserted another profit-making layer into this system.

Further discussion ensued.

Chairman Hanns requested public comment. There was none.
ADJOURNMENT

A motion was made by Commissioner McLaughlin to adjourn at 4:00 p.m. Seconded by Commissioner Ericksen.

APPROVED AND ADOPTED \textit{MAY 5, 2014}

ATTEST:

\begin{flushright}
Gail Wadsworth \\
Clerk and Ex Officio Clerk to the Board
\end{flushright}

\begin{flushright}
George Handis \\
Chairman
\end{flushright}
AIRPORT ADVISORY BOARD
MEETING MINUTES

Flagler County Airport – East Flight Training Facility
April 10, 2014 – 4:00 p.m.

MEMBERS PRESENT: Mr. James Brown, Mr. Robert Hanson, Mr. Gordon Heritage, Mr. Brian Riehie.
MEMBERS ABSENT: Ms. Julie Deily, Mr. Roy Sieger.
STAFF PRESENT: Mr. Douglas DiCarlo, Mr. Jack Thompson (C&S Companies).
STAFF ABSENT: None.
OTHERS PRESENT: None.

1. After the Pledge of Allegiance, Chairman Heritage called the meeting to order at 4:00 pm.

2. The Chairman asked for approval of the March 13th meeting minutes. A motion was made to approve these minutes which was seconded so the motion carried.

3. The Chairman said his only comment was to thank Mr. Sieger for the invitation to attend the recent workshop held on April 8th on the Airport Master Plan, saying it was very informative; he then asked for the next item, Mr. Sieger’s project update.

4. Mr. Sieger introduced Mr. DiCarlo and Mr. Thompson as the project consultant and engineer, respectively, for the Airport Master Plan and Potential Parallel Runway Study projects, saying they were there to provide an update. He then referred all to his report which outlined the following:

Project Updates

- **Design of Runway 06-24 Runway Safety Area (RSA) Improvements**
  S.E. Cline Construction, Inc. has completed all the clearing and backfill on the approach end of Runway 06 for the Runway 06-24 Runway Safety Area Improvement project. The sodding has begun on the RSA and the clearing of the ROFA is nearly complete on the approach end of Runway 06. The clearing of the RSA on the Runway 24 end is complete. The stripping of the top vegetative layer to allow for clean backfill is 75% complete on the approach end of Runway 24. Backfilling efforts are underway on this end as well. To date over 64,890 yards of dirt have been placed. The twin 48” pipes to connect the airport’s stormwater ponds has been completed. This will allow the stormwater ponds to equalize. Grading around EPOND2 is 80% complete.

- **Design for Runway 11-29 Relocation and Extension**
  Evaluation of options to limit the impacts of the landfill at the west end of the Runway 11-29 Relocation and Extension project are continuing. A meeting was held on April 9th with FAA and FDOT representatives to continue the discussion of the property acquisition east of the airport which will provide control of the Runway Protection Zone for Runway 29. A Land Exchange Agreement between Flagler County and Florida Landmark Communities, LLC was approved by the BoCC on April 7th. The land exchange was for three parcels from Landmark totaling 44.3 acres, with an appraised value of $608,000 for 3.038 acres of airport property appraised at $486,000. This property acquisition will provide ownership of the Runway Safety Area for Runway 29 when relocated. Landmark Communities has plans to construct a gas station/convenience store on the property they acquired.

- **Airport Master Plan Update**
  No Change. The Working Paper 3 development for the Airport Master Plan Update has been paused while the FDOT funded study to determine the preferred location for a parallel runway is coordinated.
Design for the Rehabilitation of Taxiways C and D
The design for Taxiway C & D Rehabilitation project is complete. The St. Johns River Water Management District (SJRWMD) stormwater permit has been submitted and the project will be bid in late summer.

Design for the Rehabilitation of Taxiway E
No change. The design for the Rehabilitation of Taxiway E is complete. The St. Johns River Water Management District (SJRWMD) stormwater permit has been submitted and the project will be prepared to bid in April, with bids due on May 16th. FDOT will fund this $1.9 million project once all bids are evaluated.

Prepare Plans and Specifications for Construction of Partial Parallel Taxiway “H”
The Preliminary Design for the Taxiway H - Design project is complete. The Preliminary Design Review meeting was held on April 3rd. The Construction Safety Phasing Plan (CSPP) will be submitted for FAA approval.

Project Definition Study for Potential New Parallel Runway
The Project Definition Package for a New Parallel Runway project is underway. Element 1 of the study, the runway length justification for the proposed runway was approved by FAA and FDOT. The environmental field review, Element 2, has been substantially completed. Development of the 10 preliminary options for the parallel runway, Element 3, is complete. These options were presented to the BoCC during a workshop on April 7th, then again on April 9th to the FAA and FDOT representatives and finally to the AAB on April 10th. The results of the study will be shown on the ALP as part of the ongoing Airport Master Plan Update. Mr. Sieger noted that some AAB members had already seen the update on this project at the recent workshop, saying a briefer version would be presented later today. Mr. Hanson wanted to know who would decide which of the runway location proposals would be used? A team consisting the Airport Director, the project consultant and engineer would review all proposals and this review should be completed within a month.

Construction of South Entrance Road (Phase II)
Four bids were received and opened on March 19th for the Construction of Phase II of the South Entrance Road. P & S Paving was the low bidder with a total bid of $1,700,503.00. The recommendation to award P & S the contract has been completed and contracts are being prepared; this contract would be on the April 21st Board of County Commissioners meeting agenda. An Amendment to Hoyle, Tanners contract for full time inspection service is being reviewed.

Additionally notable information:
⇒ The Airport Director gave an airport presentation and tour to the Maryland Club on March 20th.
⇒ The Airport Director was the guest speaker at the Chamber of Commerce Think Flagler Luncheon on March 26th.
⇒ The 4th Annual Wings Over Flagler/Rock'n the Runways will be held on April 25th and 26th.

Fuel Sales
Fuel sales were great in March, reported Mr. Sieger, with just over 9,000 gallons of Avgas and 12,000 gallons of Jet A sold.

5. ATCT Manager Comments
With Mr. Upton absent, Mr. Sieger mentioned that the control tower had about 13,400 operations in March, the highest total for the year so far. Mr. Brown asked if it would be possible to see 2013 operations on the same chart for comparison purposes? Mr. Sieger said he would see if it could be done.

6. Mr. Sieger next asked Mr. DiCarlo to update the AAB on the Airport Master Plan (AMP) and Potential Parallel Runway Study projects. The attached presentation copy shall be made part of these minutes. Following the presentation, Mr. Sieger asked if the board had any questions? Mr. Hanson asked if all variables concerning the possible runway location had been considered, especially from a pilot’s perspective? Mr. Sieger said the runway location was mainly a capacity issue with traffic on the parallel runway anticipated to be 95% touch and go operations. It would be used mainly for pattern work, according to Mr. DiCarlo, which had been discussed in detail with the ATCT manager. Mr. Riehle wanted to know if tree growth over the next 25 years had been considered, since he was aware of this being an issue at other
airports? While pine trees can grow 2' in a year, Mr. DiCarlo said that wasn't a concern here as trees can be cleared for better visibility and safety on airport property. Mr. Thompson mentioned an airport where the control tower couldn't see some of the GA area there because they weren't allowed to cut trees but said that shouldn't be a problem at Flagler. Would future business growth at the Airport or surrounding areas be discussed as part of the AMP, Mr. Brown wanted to know? The FDOT wants to focus on aviation needs so the AMP wouldn't address business growth, except that aviation compatible businesses would be preferred. Mr. Heritage asked if the AMP would outline any funding needed? According to Mr. Sieger, the Airport has developed a 20-year funding plan with a focus on the next five years as outlined in the FDOT's Joint Automated Capital Improvement Plan (JACIP). Next year's FDOT funds are locked in, per Mr. Thompson, but there are no guarantees until grants are actually written. With no additional questions on the presentation, Chairman Heritage congratulated all for an excellent job.

7. Questions/Comments/New Business
The only question from the AAB came from Mr. Brown, saying he noted in last month's meeting minutes that a mention was made of moving the meeting to another location, as well as sending a notice to airport tenants about the meeting each month; had anything come of that? Mr. Sieger pointed out that even when the meetings were held at the Chamber of Commerce, a more central location, guest attendance was minimal so meeting relocation wasn't really being considered; he did think emailing all airport tenants would be a good idea so he would try to do that within the next few months. Mr. Sieger went on to say that his Staff Assistant, Ms. Deily, would be retiring at the end of April and her replacement would be at next month's meeting instead.

8. Tenant Comments
With no tenants present, there were no questions/comments.

9. Public Comments
No public was present, so no comments were heard.

10. Adjournment was called for at 5:11 pm.
Flagler County
Board of County Commissioners
Workshop
(Special Meeting to Follow)
Monday, October 6, 2014 at 1:00 p.m.
Emergency Operations Center, Building 3, 1769 E. Moody Blvd., Bunnell, FL 32110

Workshop Agenda

1. Call to Order
2. Pledge to the Flag and Moment of Silence
3. Welcome: Flagler County Board Chair
4. Public Comment
5. SunGard Presentation
6. Airport Master Plan Discussion
7. Property Insurance Discussion
8. Adjournment

While this is a workshop only and no decisions are expected to be made by any of the governmental bodies, if a person decides to appeal any matter that may be discussed for a future proceeding, a record of the workshop may be needed and, for such purposes, the person may need to ensure that a verbatim record of the workshop is made.
FLAGLER COUNTY BOARD OF COUNTY COMMISSIONERS

OCTOBER 6, 2014

WORKSHOP

Present: Chairman George Hanns, Vice Chair Frank Mecker, Commissioners Barbara Revels, Nate McLaughlin and Charles Ericksen, County Administrator Craig Coffey, County Attorney Al Hadeed and Deputy Clerk Andrew Moss

ITEM 1 - CALL TO ORDER

Chairman Hanns called the workshop to order at approximately 1:02 p.m. in the Emergency Operations Center in Bunnell, Florida.

ITEM 2 - PLEDGE TO THE FLAG AND MOMENT OF SILENCE

Chairman Hanns led the Pledge to the Flag and requested a moment of silence.

ITEM 3 - WELCOME

Chairman Hanns welcomed everyone to the workshop.

ITEM 4 - COMMUNITY OUTREACH

None

ITEM 5 - SUN GARD PRESENTATION

County Administrator Coffey introduced the item, noting this related to the County’s business software such as inventory control, payroll, and fixed assets. Stated this was in the budget and mentioned the County was experiencing issues with the current software dating from 1998. His main question was whether to get new software or upgrade what was currently in place and analysis revealed that an upgrade was the better option.

Commissioner Revels asked if Mr. Coffey looked at alternate products.

Mr. Coffey explained there were only a few vendors who offered this type of government software package, noting to start fresh would probably cost between $1-2 million.

Chairman Hanns believed over the years the County was paying for 100% of the software, noting only a certain percentage of it worked. He felt the County should only pay for the percentage that worked.

County Administrator Coffey stated his understanding was the software worked fine and he thought it was more of a training issue.
(Item 5 - continued)

Jennifer Barker, Flagler County Clerk of Court & Comptroller Finance Director, stated there were significant differences between what was being used today and the new platforms available.

Carlos Garcia, Flagler County Clerk of Court & Comptroller IT Director, explained the benefit of moving the County's current platforms to a more standardized up-to-date platform, similar to those being used in the court division as well as land records.

County Administrator Coffey mentioned this would also aid in going paperless.

Robb Ann Perry, SPS (SunGard Public Sector), introduced herself and Scott Christensen. She thanked the County for being clients for 17 years, but reminded the BCC that the current system was also 17 years old. She presented a PowerPoint (on file in the Clerk’s Office) which offered a brief overview of the latest software “One Solution” and its capabilities.

Chairman Hanns asked if the update would interfere with ongoing processes.

Mr. Christensen responded a project plan would be implemented through SPS’s Business Process Review, noting there still could be impacts. He suggested the County might want to set a go live date with something like payroll versus general ledger.

Further discussion ensued.

Commissioner McLaughlin questioned whether this software would suffice over the long term by anticipating the next generation of software.

Mr. Christensen stated he believed SPS had taken that into account with the “One Solution” software.

Commissioner Revels asked if there would be compatibility issues with Microsoft or Apple products.

Ms. Perry stated she has not had any compatibility issues, noting she used both products herself.

Commissioner Ericksen asked if there was a designated team who was going to look at this software. He did not want Mr. Coffey to depend on the BCC to decide if the software was sufficient.

Mr. Coffey explained the County and Clerk’s Office IT staffs had looked at this software collaboratively. He also noted there would be teams looking at each module to ensure quality. He further stated it would be the users who would ensure the software did the job properly, not the BCC.
(Item 5 - continued)

Commissioner Meeker asked if upgrades would be provided and for how long. He also asked if the updates ran on an isolated piece of the system in case of glitches.

Mr. Christensen answered as long as the County was under a maintenance agreement, the upgrades would be provided. He further explained that updates first go to a test environment so the users could try them there before implementing into production.

Commissioner Hamms inquired if other counties had gone with the new software.

Mr. Christensen stated he provided a list to some of the IT staff, noting Manatee, Sarasota and Osceola counties had gone with the new software.

Mr. Coffey gave a brief summation of other technology upgrades the County was implementing.

ITEM 6 - AIRPORT MASTER PLAN DISCUSSION

Roy Seiger, Flagler County Airport Director, explained the ten alternatives that were presented to the BCC back in April, 2014 had been narrowed down to three Refined Alternatives to be reviewed today.

Doug DeCarlo, CNS Companies, gave a brief overview of the Refined Alternatives and their impacts.

Both Mr. Seiger and Mr. DeCarlo gave a brief presentation (on file in the Clerk’s Office) outlining information and answering questions about the affects each plan had relating to costs, environmental impact, and impacts to the surrounding community.

Mr. Seiger concluded by recommending Refined Alternative One to the BCC and stated this alternative had the least impact on the surrounding community, the environment and the County’s budget.

Commissioner Erickson asked if the parallel runways would increase air traffic or if the air traffic would now be divided between the two runways.

Mr. Seiger explained the idea of building the runway was to help lower capacity and planes could land on both runways simultaneously, if need be.

Doug DeCarlo noted the opportunity, for hangar expansion, general aviation terminal facilities, aircraft parking, and T-hangars to the north, once the primary runway moved south.
(Item 6 - continued)

Chairman Hanns asked if this item was simply informative or if staff was looking for direction from the BCC.

Mr. Seiger advised this was informative and would be added to the Airport Master Plan. Stated this would not be brought to the BCC for approval until the study was complete. He welcomed any ideas the BCC had.

Further discussion ensued.

Commissioner Erickson asked if there needed to be a public hearing in relation to this item.

County Administrator Coffey explained there had already been a public hearing and the public would have another opportunity to discuss this when it came back to the BCC.

Chairman Hanns questioned the requirements to have a larger fire station with the Airport expansion.

County Administrator Coffey was not sure if there were requirements necessarily, noting previous discussions regarding parcels being set aside along Belle Terre for fire station relocation.

Mr. Seiger explained there would only be a requirement to build an Aircraft Rescue and Firefighting Station if there were five regularly scheduled passenger flights per week.

ITEM 7 - PROPERTY INSURANCE DISCUSSION

County Administrator Coffey explained the BCC could set its own values or use the appraised values determined by the insurance company for the County’s buildings. He also addressed savings discrepancies relating to property insurance from two years ago, explaining the County truly saved over $100,000.

Commissioner McLaughlin believed the County should consider tearing down some buildings which were completely unusable in order to save money insuring the buildings.

Commissioner Revels mentioned she personally took the largest deductible, noting that often the issue could be fixed for less than the deductible.

Mr. Coffey stated he looked at that approach and discussed it with the insurance provider whose underwriters were unwilling to write the policy like that. He noted they still needed to reevaluate some areas which fell into coastal high hazard areas, mentioning there were different approaches used by several counties with relation to FEMA.
October 6, 2014
Workshop

(Item 5 - continued)

Commissioner Revels questioned how much was not covered by insurance policies.

Paul Dawson, Public Risk Insurance Agency, stated he focused on being sure the County's coverage was adequate, noting his preference for the blanket coverage. He explained most catastrophic events often caused more damage than the appraised value of the property, noting the blanket coverage would go above and beyond the appraised value.

Commissioner McLaughlin asked Mr. Coffey what his recommendation was.

Mr. Coffey briefly explained different deductible scenarios then stated he believed the best option for the County was a $5,000 deductible with the blanket coverage.

ADJOURNMENT

A motion was made by Commissioner McLaughlin to adjourn at 3:25 p.m. Seconded by Commissioner Ericksen.

APPROVED AND ADOPTED [Signature] [Date: November 3, 2014]

ATTEST: Flagler County Board of County Commissioners

Gail Wadsworth
Clerk of the Circuit Court & Comptroller

George Harmon
Chairman
AIRPORT ADVISORY BOARD
MEETING MINUTES
Flagler County Airport—East Flight Training Facility
October 9, 2014—4:00 p.m.

MEMBERS PRESENT: Mr. James Brown, Mr. Robert Hanson, Mr. Gordon Heritage, Mr. Brian Riehle.
Mr. Victor Natiello
MEMBERS ABSENT: None
STAFF PRESENT: Ms. Gina Friedman, Mr. Roy Sieger
STAFF ABSENT: None.
OTHERS PRESENT: Kurt Schneider, Tim Shea, Keith & Diane Corlee, Jack Thompson and Douglas DiCarlo

1. After the Pledge of Allegiance, Chairman Heritage called the meeting to order at 4:00 pm.

2. The Chairman asked for approval of the September 11th meeting minutes. A motion was made to approve these minutes which was seconded so the motion carried.

3. Project Updates

Design of Runway 06-24 Runway Safety Area (RSA) Improvements
The Runway 06-24 Runway Safety Area Improvements project is complete. Airport staff is working on completing the close out documents for FDOT.

Design for Runway 11-29 Relocation and Extension
The Runway 11-29 Relocation and Extension schematic design project is near completion. The pavement design has been re-evaluated based on the new geotechnical information. The revised Schematic Design review meeting will be scheduled for mid-October.

Airport Master Plan Update
The Working Paper 3 of the Airport Master Plan Update, which includes development alternatives, was presented to the BoCC on October 6th, and to the AAB on October 9th.

Design for the Rehabilitation of Taxiways “C” and “D”
The design for Taxiway C & D Rehabilitation project is complete and will be bid by the end of October.

Design and Construction for the Rehabilitation of Taxiway “E”
The contractor, P&S Paving is on site for the Rehabilitation of Taxiway E project. Runway 06/24 and the midfield taxiways have been closed as electrical and drainage work is beginning.

Prepare Plans and Specifications for Construction of Partial Parallel Taxiway “H”
The Final Design documents for the Taxiway H project have been reviewed and the St. John’s River Water Management District permit was received. The project will be bid in the Spring of 2015 to allow the Airport to take a FDOT grant in July 2015.
Construction of South Entrance Road (Phase II)
No Change. The Construction of Phase II of the South Entrance Road is on hold due to utility coordination with City of Palm Coast.

Florida Army National Guard (FLARNG) Renovations to 1000 Aviation Drive
The design documents for the FLARNG Renovations to 1000 Aviation Drive were submitted in September. The project was broken into several bid packages to expedite contracting. The fence portion has been bid, the telecommunications package is currently receiving price quotes and the restroom renovations are advertised for bidding. County forces have completed the interior finish upgrades to the recruiter offices and the painting of the hallways.

Additionally notable information:

- On September 18th, the Airport Director gave an airport presentation and tour to the Red Hat Hurricanes.
- On September 23rd, the Airport Director gave an airport presentation to the Republican Club at Grace’s Place in Palm Coast
- On October 3rd, the Flagler County Airport lost a tenant, Mr. Raymond Miller in an aircraft accident.

4. Fuel Sales
Mr. Sieger reported that fuel sales were the worst he has ever seen. Avgas dropping below 5,000 gallons and Jet A dropped below 5,500 gallons.

5. ATCT Manager Comments
Mr. Upton was not present. Mr. Sieger reports that operations were also the worse as well, making September the lowest all year.

6. Questions/Comments/New Business
Mr. Sieger announced that we had lost one of our tenants Mr. Raymond Miller. He crashed his aircraft in the marsh at Pellicer Bay. Mr. Sieger went on to say that this was one of the most elaborate recoveries he had seen and that it took many different organizations to recover Mr. Miller as well as his aircraft. Mr. Natiello inquired about the length of time 06/24 Runway would be closed, Mr. Sieger said about 2 months. Mr. Natiello asked if any priority would be given to Embry Riddle, Mr. Sieger replied that no preferential treatment is given to any aircraft, all aircraft are handled on a first come, first serve basis. Mr. Gordon asked about Verizon tower, and when the new identifier would go into effect, Mr. Sieger explained that the new platform is being constructed and the new identifier would be effective November 13, 2014. Mr. Natiello inquired about the County attorney situation. Mr. Sieger stated that there is still only one lawyer at this time.

Mr. Doug DiCarlo, a sub-consultant for C&S Engineers gave a presentation on Working Paper No. 3, Facility Alternatives for the Airport Master Plan. A copy of the presentation is attached.

7. Tenant Comments:
Mr. Natiello and Mr. Schneider discussed the impact of the removal of Taxiway “C”. Mr. Sieger explained that Taxiway “C” had to be removed as it did not comply with FAA Advisory Circular regarding the angle of the crossing of the runway. Mr. Corlee asked if any type of restaurant was in the plans for the new General Aviation Terminal. He thinks it is important to keep it a neighborhood airport, keeping it neighborhood friendly to reach the next generation. Mr. Sieger replied that if a restaurant would be built in the General Aviation Terminal he would speak with the owners of Highjacker’s. Mr. Sieger also echoed the importance of keeping the Flagler County Airport a neighborhood friendly airport.

8. Public Comments
No comments were heard.

9. Adjournment was called for at 5:17
END OF REPORT