CHAPTER 5
ALTERNATIVES ANALYSIS

OVERVIEW

The objective of this chapter is to identify a preliminary development plan to satisfy expected demand at Merritt Island Airport (COI) over the twenty-year planning period through a comprehensive analysis and refinement of alternatives. Unconstrained development options may be limitless, but feasible development is driven by demand, cost, available property, the long-term role of the airport as well as environmental and airspace impacts. Based on a field survey conducted on October 27, 2008, COI's current property is estimated at approximately 136.14 acres including portions which are partially submerged. In addition, the airport is surrounded by residential, commercial and institutional properties, and environmentally sensitive habitats. This in conjunction with the airport's proximity to Patrick Air Force Base, Cape Canaveral, Melbourne and Titusville Airports presents a set of unique challenges to future development at COI. As a result, a comprehensive review/coordination process between the Titusville-Cocoa Airport Authority (TICO Authority), Federal Aviation Administration (FAA), Florida Department of Transportation (FDOT), Technical Advisory Committee (TAC), and public was undertaken prior to the selection of the refined alternative herein, which represents the preferred development concept for the airport.

AIRPORT'S LONG-TERM ROLE AND SERVICE LEVEL

As discussed in **Chapter 4**, *Demand Capacity/Facility Requirements*, the airport's long-term role will remain as a general aviation utility airport, with a runway constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight or less.[1] Therefore, extensive business jet traffic and air taxi operations are unlikely to occur primarily as a result of contiguous land use, runway length, and limited property. The airport is currently designed to accommodate a B-I light aircraft (12,500 pounds or less). Although in 2007 over 500 annual B-II category aircraft operations were recorded at COI, associated with the Beechcraft King Air 200, B-II operations are expected to decrease since the primary tenant/operator of those aircraft, Baer Air, was shifting its base of operations from COI to Melbourne International and Flagler County Airports (MLB and XFL). For this reason, and also considering existing airfield separations and property constraints, an ARC of B-I light represents the most appropriate design criteria for COI. If the ARC was upgraded to a B-II category, a number of non-standard existing design requirements would need to be addressed either through FAA issuance of a "Modification to Standards" or other means, such as the runway and taxiway separations which could not be increased without significant costs,

[1] FAR Part 77, Objects Affecting Navigable Airspace.

environmental impacts, and facility impacts. The ultimate decision regarding ARC classification is at the discretion of the FAA Airport District Office. Consequently due to these issues and the expected decrease in B-II operations, it is in the best interest of the airport to remain B-I light. To accommodate this classification at COI, larger aircraft should be cautioned against use of Runway 11-29 unless advanced notification is provided to airport operations staff.

Further, the existence of non-precision instrument approaches on Runway 11 requires that the runway primary surface, which is associated with **Federal Aviation Regulations (FAR) Part 77**, *Objects Affecting Navigable Airspace,* be increased from 250 feet to 500 feet wide. This change impacts existing and future building locations and elevations on the airport. As a result, proposed development considered the primary and transitional surface requirements in evaluating future landside and airside development.

DEVELOPMENT CONSIDERATIONS

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

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

- Environmental – Airport growth and expansion has the potential to impact the airport's environs. The selected plan should seek to minimize impacts in the areas outside the airport's boundaries. Concepts should also seek to obtain a reasonable balance between expansion needs and off-site acquisition and relocation needs. The preferred development plan should also recognize sensitive environmental features that may be impacted by the concepts evaluated herein.

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

- Feasibility – The selected concepts should be capable of being implemented. Therefore, they must be acceptable to the FAA, FDOT, TICO Authority, and the community served by the airport. The preferred development options should proceed along a path that supports the area's long-term economic development

and diversification objectives.

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

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

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

Based upon each respective concept analysis and comments received from the TICO Authority, airport tenants, TAC, and the public, a recommended development concept was developed which forms the basis of the Airport Layout Plan (ALP) Drawing set.

Previously Proposed Development

In the process of evaluating potential airfield development, the 1995 Master Plan Update was reviewed to identify trends and issues which may impact future development at the airport. An evaluation of the previous demand capacity analysis revealed that COI will not reach the 60 percent capacity threshold until 2013. This capacity assessment was reviewed during the current master plan analysis, and revealed that COI will not exceed the 60 percent capacity threshold based upon annual service volume (ASV) until after 2012. According to **FAA Order 5090.3C**, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, eligibility for capacity improvements is achieved once the airfield has reached 60 percent of its current capacity.

Based upon facility requirements identified in the 1995 Master Plan Update, the following on-airport development was identified:

- Maintain Runway 11-29 and taxiway system
- Maintain runway lighting system and taxiway lighting system
- Establish run-up areas for both Runways 11 and 29
- Maintain visual approach slope indicators (VASIs) for both runway ends, replace with precision approach path indicators (PAPIs) or pulse light approach slope indicators (PLASIs) when required
- Maintain rotating beacon
- Maintain non-directional beacon (NDB) and pursue “straight-in” approach
- Establish lighted wind cones near both runway ends

- Pursue global positioning system (GPS) non-precision and precision approach systems when available
- Establish helicopter landing pad
- Maintain existing aprons
- Add T-Hangars
- Add corporate/executive hangars
- Add bulk storage hangars
- Maintain fuel farm in one location
- Maintain security fencing and limit access points into airfield, add where additional developments required.
- Develop internal access road
- Improve airport entrance
- Close Airport Road to public traffic
- Maintain pavement and drainage in existing vehicular parking areas, and
- Provide stormwater and water quality systems in accordance with the Master Drainage Plan.

A number of the previous short and mid-term goals as outlined in the 1995 Master Plan Update have been implemented including T-hangar development, upgrading VASIs to PAPIs, fencing, establishment of helicopter landing pad, addition of run-up area on Runway 29, as well as stormwater and water quality improvements. Consideration was given to these concepts as part of this master plan analysis in order to limit the number of potential options as well as address existing and future demand requirements.

Since its transfer to TICO, COI has remained a general aviation recreation airport within the Titusville Cocoa Airport system. As a result of the dynamics between the airports (Space Coast, Merritt Island and Arthur Dunn Airpark) within the TICO System, an airport improvement strategy was developed to include an evaluation of several preliminary concepts. This development strategy was used to identify ultimate runway lengths, future airfield development and revenue generation options.

Preferred Development

Due to the various constraining factors of the airport property, accommodating forecast demand may be challenging at COI unless a comprehensive alternatives analysis is conducted that incorporates owner and user input as well as FAA design standard criteria. In that regard, this chapter presents three potential development alternatives which identify various airside and landside development options to maximize use of the existing airport property, as well as acquisition of adjacent property to plan for future growth if ultimately necessary. On August 28, 2008, a TAC meeting was held to present the preliminary airport alternatives, at which time various modifications and additional facility recommendations were discussed. Following the meeting, the Consultant Team, in conjunction with airport engineers and the Authority, created a preferred development concept for COI representing a feasible plan which satisfies not only FAA design criteria but user demands as well. The preferred development concept not only includes recent planning efforts by the TICO Authority, including an additional T-hangar development

on the south side of the airport and a corporate/box hangar adjacent to Runway 11 to the north, but also presents new concepts that seek to address key needs and desires of the airport and its users such as:

- Correcting the Runway Safety Area (RSA) beyond Runway 29 by filling-in the Intracoastal Waterway (Newfound Harbor).
- Seawall improvements along the entire eastern boundary of the airport property to proactively approach the ongoing coastal erosion problem.
- Improved capacity through the provision of additional connector taxiways and apron areas.
- New hangar development areas to accommodate anticipated demand.
- Replacement of the underground fuel storage tanks to comply with environmental regulations with an aboveground fuel farm facility in a centralized location on the airport property.
- Replacement of aging buildings, some of which are obstructions to the runway's imaginary surfaces, with new facilities (multiple-tenant or single-tenant facilities, based on specific needs and funding mechanisms).
- Restaurant development in the northeast corner of the airport property, positioned to overlook the Intracoastal. Ultimately, the restaurant could be accessed by seaplanes with the development of a seaplane ramp and apron parking area, and by boats by providing docking facilities.
- As mentioned, the airport is situated in a desirable location for seaplane operations; thus a seaplane landing area, as well as seaplane ramp, apron, and hangar are included in the preferred development concept.
- If ultimately needed, the preferred development concept also depicts acquisition of approximately 28.36 acres of property adjacent the airport to the northeast.

As mentioned, the need to accommodate forecast demand is constrained by the existing available property, recent changes to stormwater requirements as well as FAA airfield separation and obstruction criteria. Through a careful consideration of these factors, the preferred/refined development concept represents the ideal layout of FAA-required and other desired improvements during the twenty-year planning period. While many of these facilities may not be developed within this timeframe, or could be developed in an alternative configuration, planning for future growth is important for balancing airfield safety with other landside and support facility improvements. Since the needs of airport users and tenants may change, and based on further environmental, drainage and engineering investigations, the preferred development concept should be considered a flexible guide for the future layout of facilities at COI.

The subsequent sections of this chapter present the preliminary development alternatives for COI, ultimately leading into the detailed discussion of the preferred development concept including preliminary phasing and funding plan for the twenty-year planning period.

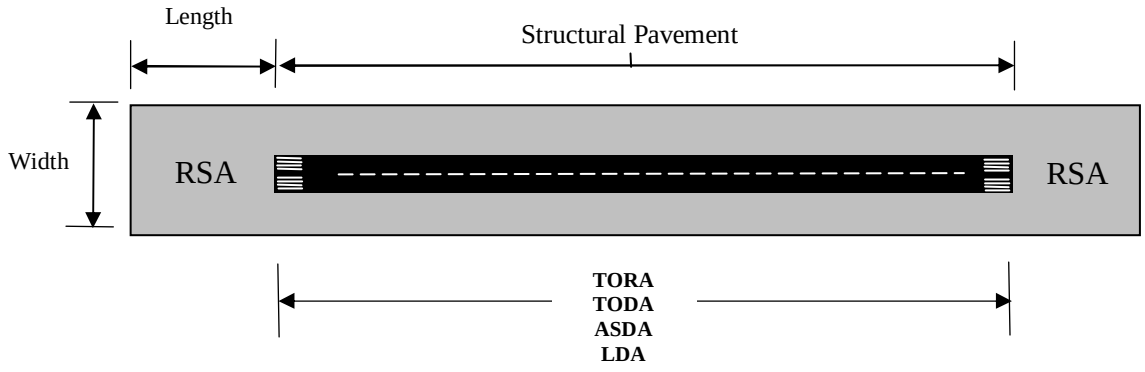
DEVELOPMENT CONCEPTS

Runway Safety Area (RSA) Evaluation

The RSA is an integral part of the runway environment. RSA dimensions are established in **FAA AC 150/5300-13**, *Airport Design,* and are based on the runway's designated Airport Reference Code (ARC). The RSA is intended to provide a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury and the hazard of structural damage during overruns, undershoots and lateral veering. Many circumstances contribute to the potential for aircraft excursions including insufficient runway length, weather conditions with low visibility, site constraints including precipitous terrain drop-offs, bodies of water, wetlands, residential or commercial development, availability of visual and electronic aids for landing, as well as runway contamination caused by rain, snow, and ice. In addition, mechanical failure may inhibit an aircraft's propensity to safely decelerate during landing or while performing an aborted takeoff. As such, the effects of physical constraints on the airport's runway environment are compounded during aircraft mechanical malfunctions.

The RSA maintains an important role in the runway environment. Its function is to create a buffer between the runway pavement and non-movement areas. According to the FAA, takeoffs and landings are generally regarded as the most critical phases of flight, during which most aircraft accidents occur. During these segments, aircraft are subject to a variety of controls and are constrained by the runway's operational dimensions. Moreover, these dimensions test the aircraft's operational limitations during takeoff and landing maneuvers. **Figure 5-1** depicts a standard RSA configuration where the entire runway length is usable for all aircraft operations.

Figure 5-1
Standard Runway Safety Area (RSA) Profile



Source: The LPA Group, 2008

At COI, existing FAA design standards regarding RSA require 240 feet beyond each threshold of Runway 11-29. Currently, the southeastern half of Runway 11-29 is surrounded on three sides by the Intracoastal Waterway (Newfound Harbor). While the RSA beyond Runway 11 meets FAA standards, coastal erosion has and continues to

occur beyond Runway 29 which has reduced the functional length of the RSA to approximately 60 feet. Further during high tide conditions, it has been noted that the functional length may be even less. Therefore, based on the criteria established in **FAA Order 5200.8**, *Runway Safety Area Program*, alternatives to address this RSA shortfall were investigated in **Appendix E**, *Runway Safety Area Determination*, of this report. Per FAA criteria, the RSA analysis considered a combination of the following alternative categories:

1. Relocation, shifting, or realignment of the runway.
2. Reduction in runway length.
3. A combination of runway relocation, shifting, grading, realignment, or reduction.
4. Declared distances.
5. Engineered Materials Arresting System (EMAS).

As identified in the runway length analysis in **Chapter 4**, *Demand Capacity/Facility Requirements*, some aircraft which are currently based at COI require more runway length than Runway 11-29 currently provides in order to accommodate takeoff demands at full payload (i.e., full fuel and passenger capacities). Consequently, the operational capability of aircraft is already restricted by the 3,601 foot length of Runway 11-29, and therefore, maintaining this length was considered of primary importance to the Authority and for the RSA alternatives analysis. For example, since Runway 11-29 is the only available runway at COI, maintaining the current runway length for both takeoff and landing is considered of primary importance for continued operational safety and also to sustain the operations of existing businesses based at the airport. A reduction in the runway length could also pose a serious safety threat, while potentially increasing aircraft noise exposure to residential properties currently located approximately 400 feet beyond the northwestern end of the runway (Runway 11 threshold). Further, due to occasional use of the airport by larger ARC B-II category aircraft, such as the Beechcraft King Air, maintaining the current runway length is considered vital for the continued safety of the airfield. Therefore, a primary goal of the analysis was to provide a standard RSA while preserving the already limited runway length at COI. Additionally, Engineered Materials Arresting System (EMAS) cannot be used since the existing and forecast fleet is incompatible.

As a result of these initial runway length and safety preservation concerns, only three alternatives were considered for correcting the non-standard RSA prior to Runway 29 threshold including:

- **Alternative A** – RSA Fulfillment Using Declared Distances Only
- **Alternative B** – RSA Fulfillment Using Dredge and Fill
- **Alternative C** – RSA Fulfillment Using Relocated Thresholds

It is important to note that the RSA evaluation was based upon the dimensional requirements for a B-I light airport, which is 120 feet wide by 240 feet long. If the

airport, however, is upgraded to a B-II, then the dimensional requirements would expand to 150 feet wide by 300 feet long.

As shown in **Table 5-1**, declared distances, or the amount of runway length which is usable for various aircraft operations (see definitions below), was considered a primary evaluation factor in the RSA analysis.

Takeoff Run Available (TORA) – The distance to accelerate from brake release to lift-off plus safety factors.

Takeoff Distance Available (TODA) – The distance to accelerate from brake release past lift-off to start of takeoff climb plus safety factors.

Accelerate-Stop Distance Available (ASDA) – The distance to accelerate from brake release to V_1 (takeoff decision speed) and then decelerate to a stop, plus safety factors.

Landing Distance Available (LDA) – The distance from the threshold to complete the approach, touchdown, and decelerate to a stop, plus safety factors.

Table 5-1
RSA Alternatives
Declared Distances Calculations

Declared Distance	Existing		Alternative A		Alternative B		Alternative C	
	RW 11	RW 29	RW 11	RW 29	RW 11	RW 29	RW 11	RW 29
TORA	3,601	3,601	3,421	3,601	3,601	3,601	3,421	3,421
TODA	3,601	3,601	3,421	3,601	3,601	3,601	3,421	3,421
ASDA	3,601	3,601	3,421	3,601	3,601	3,601	3,421	3,421
LDA	3,601	3,601	3,421	3,421	3,601	3,601	3,421	3,421

Based upon 60 foot RSA length.
Source: The LPA Group Incorporated, 2008.

Specifically, since it was important to maintain the entire length of Runway 11-29 for all aircraft, Alternatives A, Declared Distance, and C, Relocated Thresholds, were subsequently considered impracticable due to their reduction in usable runway length. Therefore, Alternative B, RSA fulfillment using dredge and fill, was identified as the preferred alternative for correcting the Runway 29 RSA shortfall. As part of the preliminary RSA cost estimates provided in Appendix E, all RSA alternatives included seawall improvements to the airport's entire coastal boundary in an effort to take a proactive approach to the ongoing erosion issue.

The only way to preserve the entire length of Runway 11-29 for all aircraft operations at COI while correcting the non-standard RSA is to expand the RSA into the Intracoastal Waterway (Newfound Harbor). Based on discussions, the Authority agreed that this is

the preferred option for correcting the non-standard RSA (i.e., RSA Alternative B), pending the outcome of an environmental study, and management is currently pursuing this option with FAA. Additionally, improvements to the seawall surrounding the entire coastal boundary of the airport property are needed to prevent further coastal erosion and to stabilize the RSA area, whether expanded or not. This consists of approximately 3,000 linear feet of seawall improvements.

Accordingly, Alternative B proposes that additional land areas be reclaimed from the Intracoastal within the immediacy of Runway 29 through dredge and fill, thus allowing Runway 11-29 to maintain its current 3,601 feet of usable pavement length for all airport operations. Further to preserve the length of Runway 11-29, an additional 0.33 acres of land must be acquired prior to the Runway 29 threshold to satisfy current B-I light RSA standards.

While this alternative represents the most costly method of attaining standard RSA at COI, it is the only alternative that preserves the entire 3,601 feet for all operations. Additionally, no relocation of Navigational Aids (NAVAIDs) or lighting would be required for this alternative, and no physical work on the runway would be needed (e.g., remarking). As a result, this alternative is preferred from an overall safety standpoint. When considering that seawall improvements would be conducted under any selected RSA corrective measure, the additional costs associated with Alternative B are minimal in comparison to the safety and operational benefits of the project. For these reasons, the Authority selected Alternative B as the preferred RSA option for COI; therefore all alternative discussions in this chapter incorporate this Runway 29 RSA corrective measure as well as seawall improvements along the airport's coastal boundary. A preliminary review of potential environmental impacts associated with this project is presented within the refined alternative section of this report.

Anticipated order of magnitude costs associated with RSA Alternative B, RSA fulfillment using dredge and fill, including seawall improvements, are shown in **Table 5-2**.

Table 5-2
Order of Magnitude Costs
Preferred RSA Alternative

Project	Estimated Costs
Design & Environmental Permitting	$550,000
Construction	$6,170,000
Order of Magnitude Costs	**$6,720,000**

Source: The LPA Group Incorporated, 2008.

Instrument Approach Evaluation

As previously illustrated in **Figure 2-7**, COI is surrounded by Class E airspace and is also located completely within Restricted Area R-2935 (Cape Canaveral). Aircraft control within Class E airspace begins at 700 feet above ground level (AGL), and flight within R-2935 is restricted at altitudes above 11,000 feet mean sea level (MSL). There are also several towered airports near COI which are surrounded by Class C (controlled) airspace, including Space Coast Regional Airport (TIX) to the northwest, Cape Canaveral Air Force Station Skid Strip (XMR) to the northeast, Patrick Air Force Base (COF) to the southeast, and Melbourne International Airport (MLB) to the south. The airport's proximity to several airports and military restricted areas may limit the development of additional non-precision approaches to COI. Currently, a GPS/RNAV non-precision instrument approach is published for Runway 11 requiring at least one-statute mile visibility.

As part of the airfield alternative analysis, an additional non-precision instrument approach with visibility minimums of greater than or equal to one-statute mile was considered for Runway 29. The addition of another instrument approach would improve the airport's overall capacity and flexibility. Although an approach to Runway 29 may be impacted by restricted airspace associated with Kennedy Space Center operations, a review of wind data from the NASA Shuttle Landing Facility (years 1994-2007) indicated that Runway 29 provides substantially better wind coverage for approaches during Instrument Flight Rule (IFR) conditions compared to Runway 11.

The criteria for selection of airports and runways for development of GPS procedures emphasize safety, such as providing emergency medical operations or simplifying existing procedures. Other considerations relate to activity level, at least 500 procedures per year, and/or resolution of capacity issues. Non-precision instrument approach requirements as designated in Appendix 16 of **FAA AC 150/5300-13**, *Airport Design*, are outlined in **Table 5-3**.

Table 5-3
Non-Precision Instrument Approach Requirements

Visibility Minimums	< 1-Statute Mile	1-Statute Mile	> 1-Statute Mile
Height Above Touchdown	340 ft	400 ft	450 ft
TERPs Approach	20:1 Clear	20:1 Clear or penetrations lighted for night minimums	
Minimum Runway Length	3,200 ft (paved)		
Runway Markings	Non-Precision		
Holding Position Signs and Markings	Non-Precision		
Runway Edge Lights	HIRL/MIRL	MIRL	
Parallel Taxiway	Required	Recommended	
Approach Lights	Required	Recommended	
Runway Design Standards	≥ 3/4 Statute Mile Approach Visibility Minimums		
Threshold Siting Criteria	20:1	15:1[1] 20:1[2]	15:1[1] 20:1[2]

Notes:
[1]Runway serving small airplanes with approach speeds of less than 50 knots.
[2]Runway serving aircraft with approach speeds greater than 50 knots

Sources: FAA AC 150/5300-13, Change 13, Appendix 16, The LPA Group Incorporated, 2008.

Runway 29 – GPS/RNAV Approach

An evaluation of a non-precision approach to Runway 29 was considered. Previous alternative development discussions included a non-precision, ≥ ¾ mile visibility approach to Runway 29. Yet, in considering the approach procedures in relation to airspace in the area, it may not be possible for aircraft to perform a non-precision or precision approach to Runway 29 without encroaching upon Patrick AFB's terminal airspace and surrounding warning areas. Since Patrick AFB's airspace abuts COI's airspace, there may not be enough distance between the two to meet the Terminal Instrument Approach Requirements (TERPS). Further, since Patrick AFB is the controlling center for Cape Canaveral operations in addition to high-speed fighter jets, it makes encroachment by small and slow flying aircraft dangerous. Therefore, an approach to Runway 29 was rejected from further evaluation.

Pavement Maintenance

"In 1992, the FDOT implemented a Statewide Pavement Management Program (SPMP) to improve knowledge of pavement conditions at public airports, identify maintenance needs at individual airports, automate information management, and establish standards to address future needs. Furthermore, this new innovation was aimed to assist the airports in the State of Florida to comply with the **Public Law 103-305** which required the airports to establish this program when applying for the FAA's funding….The FAA requires airports using the Special Airport Improvement Program grant to develop a pavement maintenance program (**FAA Advisory Circular 150/5380-6B**)….Also, the detailed inspection of airfield pavements must be conducted at least once a year (without PCI) or every three years if pavement deterioration is characterized in the form of a

Pavement Condition Index (PCI) survey."[2] The goal of this program was to identify capital improvement projects, and identify future funding scenarios. In 2005, Mactech Engineering Consulting Inc. was contracted to provide pavement condition index reports to the FDOT Aviation Office as part of this program. Since a pavement management report was unavailable at the time of this writing, a visual inspection of the runway strip, taxiways and apron pavements at COI was conducted in an effort to determine the timing of pavement overlays and improvements for inclusion into the capital improvement program provided in **Chapter 7** of this report. Using the FDOT criterion illustrated in **Figure 5-2**, pavement maintenance improvements were determined as outlined in **Table 5-4** as of March 2008.

Figure 5-2
Pavement Rating Matrix

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

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

[2] Florida Department of Transportation Pavement Management Program, 2008

Table 5-4
Pavement Conditions

Pavement Section	Condition	Estimated Maintenance Timeframe
Runway 11-29	3-4	2013
Taxiway A	4	2017
Taxiway B	4	2018
North Apron	4	2020
South Apron	3	2013

Source: The LPA Group Incorporated, 2008.

ALTERNATIVES ANALYSIS

In this section, potential airport development alternatives are presented in an effort to identify a feasible and flexible plan for the future development of COI. Based upon forecast demand and identified facility requirements (**Table 5-5**), three alternatives were created. The alternatives were designed to build upon one other, thus Alternative 1 includes the least airport development and Alternative 3 includes the most airport development. At the end of this chapter, a preferred development concept is presented which represents the ideal long-term development plan for the airport considering environmental, design and stormwater requirements as well as input from the Authority, airport tenants, and other agencies. To plan for unforeseen growth at the airport, and to allow for greater flexibility, the preferred development concept generally depicts greater opportunities for expansion than anticipated by the forecasts (i.e., an unconstrained development scenario).

- **Alternative 1** – Demand Based Development
- **Alternative 2** – Limited Development
- **Alternative 3** – Unconstrained Development

Alternative 1 takes a reactive and conservative approach to airport development. The development in this alternative was based on the anticipated growth shown in **Chapter 3**, *Forecasts of Aviation Activity*. This alternative does not account for future business opportunities that may arise during the planning period nor does it consider options for increased demand beyond those identified in the forecast chapter.

Alternative 2 assumes that the demand of based aircraft, businesses, and operational activity would likely exceed those previously identified in the forecast chapter. Various airside and landside improvements were shown to account for increased activity; however, in order to remain cognizant of costs, only mandatory improvements to meet higher demand levels were shown.

Alternative 3, the unconstrained development alternative, plans for the best case aviation activity growth scenario. This option assumes that grant and local match funds for development will be available to accommodate soaring levels of growth and to create

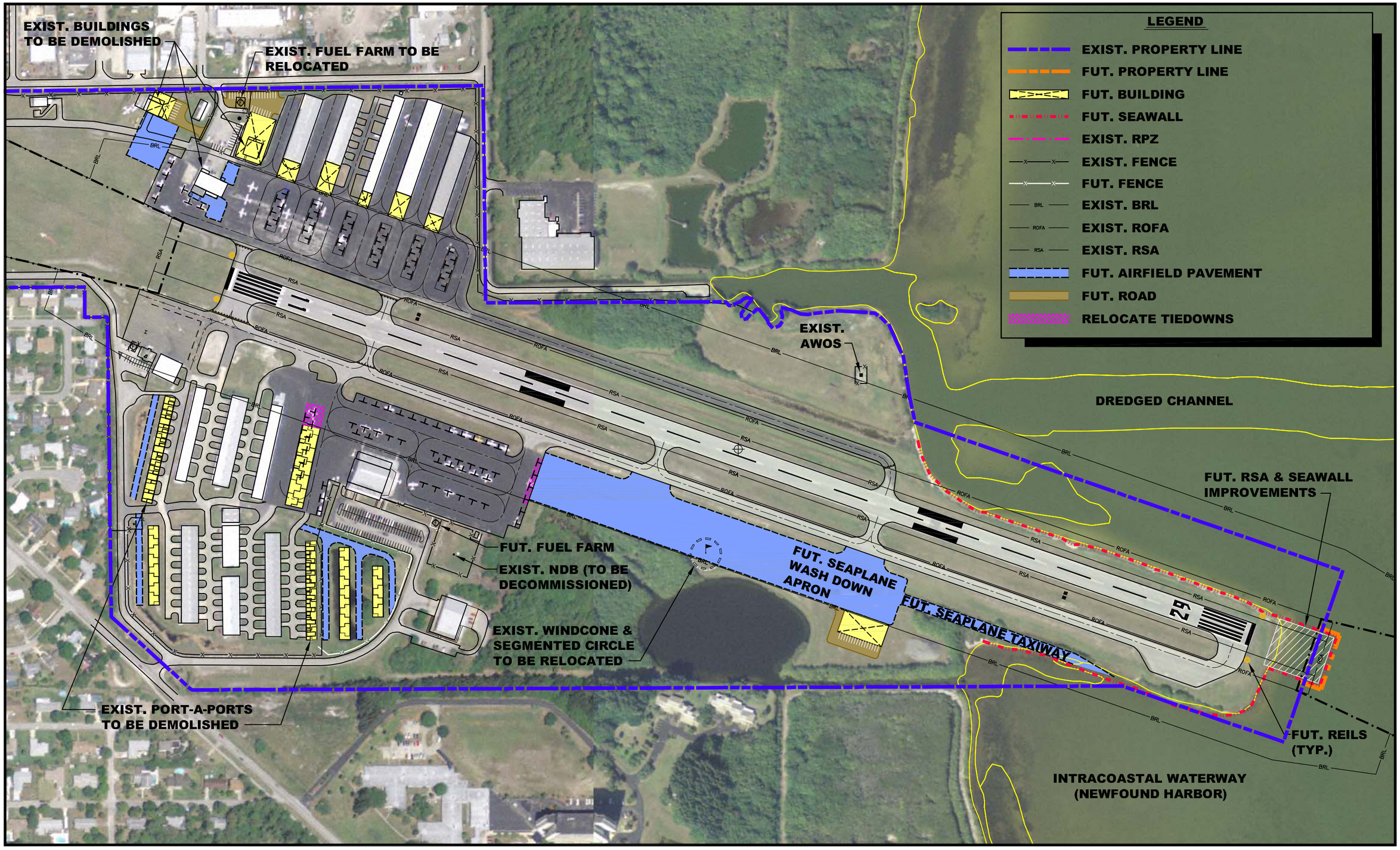
provisions for the many business opportunities that could arise during and beyond the planning period.

Table 5-5
Summary of Facility Requirements

Runways and Taxiways	1. Conduct routine pavement maintenance on all runways and taxiways. 2. Install Runway Safety Area improvements. 3. Install/improve seawall. 4. Remove taxiway markings and associated lighting on Sheriff's Apron. 5. Add additional connector taxiways to improve traffic flow.
General Aviation	1. Construct at least 53 additional T-hangar units (~74,200 SF). 2. Construct at least 2 additional Corporate/Conventional Hangars. 3. Construct at least 24,442 SY of additional aircraft storage apron.
Airport Support Facilities	1. Close underground fuel tanks and replace and relocate fuel farm to above ground facility. 2. Identify locations for potential seaplane ramp, apron, and hangar development. 3. Identify locations for potential restaurant development. 4. Upgrade security fencing, and incorporate FDOT Security Requirements.
Documentation	1. Develop Pavement Condition Report. 2. Update GA Airport Security and Contingency Plan per FDOT/FAA Requirements.

ALTERNATIVE 1 – DEMAND BASED DEVELOPMENT

The demand previously identified in **Chapter 4**, *Facility Requirements*, was used as a basis of development for Alternative 1. As illustrated in **Figure 5-3**, this alternative meets the airport's minimum requirements for anticipated development through the year 2027; however, it does not make provisions for unforeseen business opportunities or for increases in traffic that may exceed the *Forecasts of Aviation Demand* as presented in **Chapter 3**. The purpose of this alternative is to illustrate the amount of development that can be expected should the airport continue to grow on a slow but steady pace throughout the twenty-year planning period. The following sections describe the various improvements associated with Alternative 1.



LPA	Merritt Island Airport Master Plan Update	ALTERNATIVE 1	0' 150' 300' SCALE: 1" = 300'		DATE 04/21/2009 5-3 FIGURE NO.

Airside Development

RSA & Seawall

As mentioned earlier, the preferred option for correcting the non-standard RSA proposes that land areas be reclaimed from the Intracoastal Waterway (Newfound Harbor) within the immediacy of Runway 29 through dredge and fill, thus allowing Runway 11-29 to maintain its current 3,601 feet of usable pavement for all airport operations. Additionally, improvements to the seawall surrounding the entire coastal boundary of the airport property are included to prevent further coastal erosion and to stabilize the RSA area, consisting of approximately 3,000 linear feet of seawall improvements. To conduct this project, approximately 0.33 acres of property acquisition/easement beyond the Runway 29 end would be necessary; however, according to property information, a Corrective Dedication of Clear Zone Easement No. 23957-A provided by the grantor, Trustees for the Internal Improvement Fund State of Florida, issued in 1965 shows a dedicated clear zone area beyond the existing airport property boundary. This clear zone area has the following dimensions: 260 feet x 901.12 feet x 350 feet. Therefore, since an easement already exists, it may be possible to obtain the additional property required to accommodate RSA and seawall requirements. Still, since this will require the cut and fill of portions of the Intracoastal Waterway, careful consideration of potential environmental impacts must be undertaken. As part of the engineering analysis for the RSA and seawall improvements, the installation of salt water resistant, long-lasting plastic/vinyl, composite, or metal seawalls should be investigated for COI, rather than stone seawalls which require frequent maintenance and replacement.

Taxiways

As described in **Chapter 4**, *Demand Capacity/Facility Requirements*, the existing 150-foot runway centerline to parallel taxiway centerline at COI satisfies FAA standards associated with ARC B-I light facilities (i.e., those airports designed for aircraft with maximum takeoff weights of 12,500 pounds or less). Additionally, all taxiways at COI have a minimum width of 35 feet, thus exceeding the ARC B-I light requirement of 25 feet. Therefore, Alternative 1 includes no provisions for new taxiway development or expansion during the planning period. However, with the south apron expansion depicted in **Figure 5-3**, connections to Taxiway A, at Connector Taxiways A3 and A4, are included to allow for efficient access between the runway and expanded apron. Subsequently some increased airfield capacity could be expected through this development, since aircraft would be able to exit the runway and immediately enter a new apron area at key rollout points (1,550 feet and 2,300 feet after landing on Runway 11; 1,300 feet and 2,050 feet after landing on Runway 29).

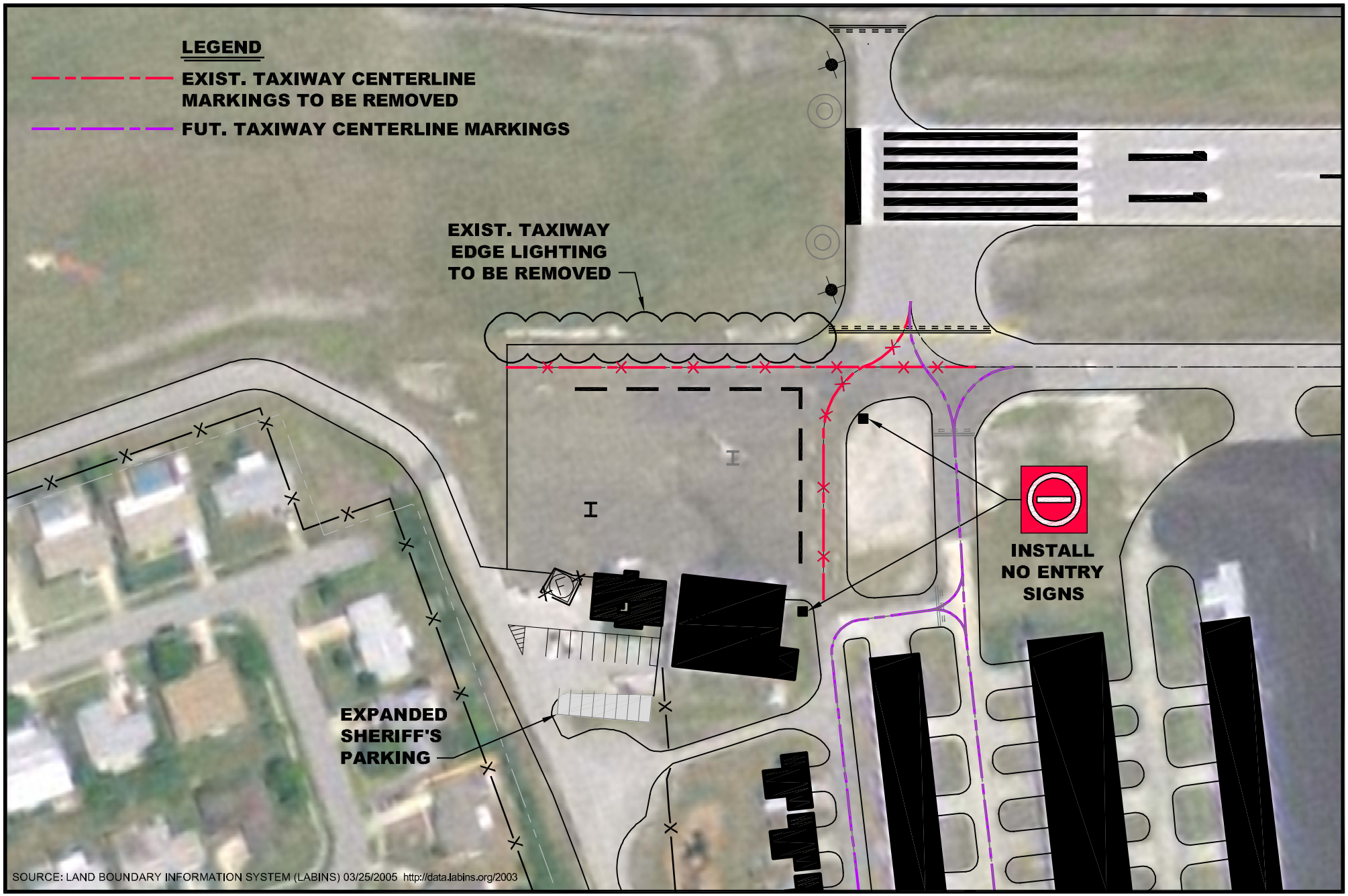
Additionally, a noteworthy concern associated with the lighting and marking of the Sheriff's apron was identified at the beginning of this Master Planning effort. Specifically, the Sheriff's apron is currently marked and lighted as an extended portion of Taxiway A, which occasionally causes aircraft to continue down Taxiway A rather than turning to enter the northwestern end of the runway (Runway 11 end), particularly during nighttime operations when the pavement is less visible. This confusing condition has the

potential to seriously interfere with emergency helicopter operations by the Sheriff; therefore this Alternative includes the installation of appropriate signage to correct the issue (e.g., No Entry Sign) and the removal of some taxiway markings and lighting, as depicted in **Figure 5-4**. Moreover, efforts should be undertaken to restrict any civilian aircraft from entering the Sheriff's apron, including those parked within the current T-hangars and Port-a-Ports located directly to the south.

Lighting and NAVAIDS

Runway End Identifier Lights (REILs) were the only airfield lighting improvement recommended for COI in the facility requirements analysis. Accordingly, Alternative 1 includes the provision of REILs beyond both ends of Runway 11-29 to provide enhanced visibility of the runway during nighttime and low-visibility approaches. Improved approach lighting is considered an important safety benefit for the airport because of the residential development located approximately 400 feet beyond Runway 11 and the non-standard RSA beyond Runway 29. Although a non-precision instrument approach is not being considered for Runway 29 during the planning period, due to the presence of restricted airspace to the east of the airport, the installation of REILs beyond Runway 29 would provide enhanced safety by increasing the runway end's visibility. However, prior to the installation of REILs beyond either runway end an evaluation of the potential impacts, if any, of light emissions to adjacent and nearby residential developments may be necessary, particularly for Runway 11.

Further as illustrated in Alternative 1, relocation of the windcone and associated segmented circle would be needed in order to accommodate the expansion of the south apron as shown in **Figure 5-3**. As mentioned above, other NAVAID facilities, such as a non-precision instrument approach (e.g., GPS approach) to Runway 29, were eliminated from consideration primarily due to constraints in the surrounding airspace. The refined alternative depicts potential relocation sites for lighting and NAVAID facilities impacted by the proposed development at COI.



Brevard County - Merritt Island Airport Master Plan Update

SHERIFF'S APRON IMPROVEMENTS

0' 50' 100'
SCALE: 1" = 100'

DATE 04/21/2009

5-4
FIGURE NO.

Aprons (tie-downs)

In **Chapter 4**, no apron (tie-down) space deficits were identified for COI throughout the remainder of the planning period; although, this conclusion was contingent on the aircraft storage demand, including the current hangar waiting list being satisfied by new development. For this reason, Alternative 1 includes a modest expansion of the south apron – the western half of the apron illustrated in **Figure 5-3** is intended for aircraft tie-downs; the eastern half is intended for seaplane parking (as described later). The purpose of this apron expansion is to accommodate the development proposed under Alternative 1, by providing a tie-down location for aircraft during construction/replacement of hangars on the north and south sides of the airport. For example, the construction of the T-hangar on the south apron would remove approximately 10 tie-down positions. Additionally, a temporary aircraft parking area would be needed during the replacement of Port-a-Ports with T-hangars, as well as other aircraft hangars on the north apron.

Since this new apron development may be eligible for federal funding, it would clear the way for future development on the south side of the airport, such as a long-term hangar development at the rear of the apron. Although, it is noted, that potential environmental impacts and permitting/mitigation efforts, including wetlands and stormwater drainage and retention issues, must be evaluated prior to the construction of such an apron. Because of increased impervious surface, the viability of increasing the existing drainage pond was considered as part of the development. Still additional retention features must be considered in conjunction with any potential airport development.

Landside Development

Hangars

Previous chapters of this report have described the significant demand for additional hangar storage at COI, evidenced by the airport's ever-growing waiting list, recent planning efforts for new hangar developments, and FDOT-authorized funding for those developments. The overall demand was determined in **Chapter 4** as 53 additional T-hangar bays and two additional conventional/corporate hangars (approximately 31,000 square feet) by the end of the planning period; thus Alternative 1 includes a variety of new, expanded, and relocated T-hangar and conventional/corporate hangar developments to accommodate this demand as illustrated in **Figure 5-3**.

The following T-hangar developments are included under Alternative 1 in order to accommodate the identified T-hangar demand at COI. As mentioned earlier, the purpose of Alternative 1 is to satisfy the airport's minimum requirements for the planning period through a straightforward development scenario. For that reason, areas that are currently developed and accessible are maximized to the fullest extent to achieve this goal.

- Expansion of the five T-hangar buildings on the north side of the airport to provide approximately 14 new T-hangar bays.
- Replacement of the two rows of port-a-ports (15 port-a-port bays) on the south side of the airport to provide approximately 21 new T-hangar bays (or total of 6 new aircraft bays).

- Development of three new T-hangar buildings on the south side of the airport to provide approximately 22 new T-hangar bays. The three new T-hangar buildings are located in areas currently used for stormwater retention; thus, new or expanded stormwater retention ponds would need to be established in order to construct these T-hangars. Additionally, relocation of the airport fence around these new T-hangars would be necessary to restrict public access to the airfield and hangar areas.
- Development of one new T-hangar building on the south apron to provide approximately 11 new T-hangar bays. The development of this T-hangar building would require relocation of 10 tie-down positions which could be accommodated on the expanded portion of the south apron (as described earlier).

Overall, Alternative 1 includes approximately 53 additional T-hangar bays, and, therefore, the illustrated development would accommodate the airport's identified T-hangar requirement for the planning period.

In order to satisfy the corporate/conventional hangar requirement, Alternative 1 includes the removal and replacement of existing hangars and buildings on the north side of the airport which are currently in poor condition, as well as the development of a new seaplane operations/maintenance hangar on the south side of the airport (as described later). While it may be less expensive to maintain and expand the existing hangars and buildings in the short-term, this alternative considers the long-term durability of these facilities and the needs of their respective tenants, as well as conformance with FAA design criteria such as location beyond the Building Restriction Line (BRL) associated with the existing non-precision approaches to Runway 11.[3] Some modifications to the airport fence would be necessary to restrict access to the airfield and hangar areas.

Therefore, as depicted in **Figure 5-3**, development includes two new hangar or office/ instructional buildings (6,000 square feet and 14,000 square feet) on the north side of the airport to replace the aging hangar facilities – note their location beyond the BRL to conform to FAA standards. In addition, automobile parking areas are provided with each new hangar facility. Some issues must be considered prior to the development of such hangar facilities; specifically, the underground fuel storage tanks must be removed and the site cleaned, before new facilities can be developed in that location (near the north entrance to the airport). Potential environmental liabilities associated with the demolition of the aging hangars must also be investigated (such as spills, asbestos, contamination, etc., which are typically evaluated as part of an environmental site assessment study).

Terminal

Space Coast Aviation recently completed a reconfiguration of their terminal and hangar facility on the south apron which provided 12,000 square feet of terminal space for passenger and pilot amenities. Since the terminal now exceeds the long-term terminal space requirement of 9,750 square feet, no alternatives for terminal development or

[3] A Building Restriction Line (BRL) essentially illustrates the location where a building height may obstruct the runway's Federal Aviation Regulation (FAR) Part 77 Imaginary Surfaces.

expansion are included under Alternative 1, or any other alternatives herein. However, areas around the terminal should be reserved in case Space Coast Aviation ultimately needs to expand to accommodate their business needs.

Automobile Parking

Although a deficit of automobile parking spaces was identified in **Chapter 4**, the deficit is generally satisfied because most aircraft owners park their vehicles within their hangars versus designated parking lots. Parking within hangars is permitted by the *Titusville-Cocoa Airport Authority's Rules and Regulations for Merritt Island Airport* (November 12, 2002). Nevertheless, in order to accommodate the development proposed under this alternative, automobile parking areas are provided around new hangars and buildings as depicted in **Figure 5-3**.

Fuel Storage

The existing fuel farm at COI consists of underground fuel storage tanks containing both 100 LL (avgas) and Jet-A, and is located near the north entrance to the airport. Recent changes in federal environmental regulations require airports to remove underground fuel tanks and replace them with aboveground units. Therefore, in order to comply with federal environmental regulations, this alternative includes a new fuel farm location on the south side of the airport, adjacent to Space Coast Aviation's terminal, with two 10,000 gallon aboveground fuel tanks (one for 100 LL and one for Jet-A) to satisfy the requirement identified in **Chapter 4**. Since Space Coast Aviation is the only authorized vendor of aircraft fuel at COI, this fuel farm site is strategically positioned for their operations. However, due to tight turn radii and existing parking areas, several roadway improvements would be needed so that a fuel tanker could efficiently access and maneuver around this site when making a fuel delivery, or any potential site on the south side of the airport. As a result, subsequent alternatives herein consider fuel farm sites on the north side of the airport.

Roadways, Access, and Signage

Since Alternative 1 is purposely intended to maximize areas of the airport which are currently developed and accessible, no roadway, access, or signage improvements are included under this alternative. However, as mentioned earlier, airfield signage improvements should be considered to prevent aircraft from entering the Sheriff's apron, thereby preventing a potentially hazardous scenario.

Non-Aviation Use

Due to the limited available property for aviation development at COI, this alternative does not designate any areas of the airport property specifically for non-aviation use. Alternatives 2 and 3 depict a potential restaurant and boat dock facility

Seaplane Operations

The airport's location adjacent the Intracoastal Waterway (Newfound Harbor) creates an ideal environment for seaplane operations, although no designated seaplane landing area or on-airport support facilities currently exist to accommodate such operations. This has

been a long-term desire of airport tenants, as documented in the 1995 Master Plan Update and through recent discussions with the Authority and TAC. Further, a current airport tenant, Top Flight, provide maintenance services to seaplane operators within the area. As such, Alternative 1 depicts on-airport facilities, including a seaplane launch ramp, 12,000 square foot hangar, and apron in the southeast corner of the property, in support of a potential seaplane landing area in the Intracoastal Waterway (Newfound Harbor).

Automobile access to the seaplane hangar would be provided by a designated vehicle lane on the expanded portion of the south apron, which may not be desirable to the Authority or a potential tenant. Therefore it may be more beneficial to locate a seaplane hangar and associated support facilities on the north side of the airport where vehicle access could be provided from Wall Street, depending upon the preferred location of a seaplane landing area in the Intracoastal and required wind coverage. Potential environmental impacts and permitting requirements associated with the seaplane launch ramp entering the Intracoastal Waterway (Newfound Harbor), such as wetlands, seagrass, etc., must be considered prior to development. Although, based on discussions with the FAA at the time of this writing, they agreed that seaplane operations would be beneficial to COI, and indicated a willingness to at least fund the construction of a seaplane launch ramp at some point in the future.

With regard to a potential seaplane landing area in the Intracoastal Waterway (Newfound Harbor), the FAA and FDOT have several operational requirements that must be considered, in addition to approvals and permitting from other federal, state, and local agencies. According to **FAA AC 150/5395-1**, *Seaplane Bases*, Part 77 imaginary surfaces only apply to seaplane bases only if sea lanes are outlined by visual markers. Based on discussions with personnel from the Authority, FAA, and FDOT, it is anticipated that a potential seaplane landing area at COI would not require visual markers. Thus an obstruction evaluation would not be required. However a completed **FAA Form 7480-1**, *Notice of Landing Area Proposal*, would have to be submitted to the FAA in order to pursue such a seaplane landing area at the airport. Consistent with FAA requirements, **Florida Administrative Code (FAC) 16-60.007**, *Airfield Standards for Licensed Airports*, dictates that a seaplane landing area must have a minimum landing length of 2,500 feet, width of 200 feet, and depth of three feet. Other dimensional criteria, equipment requirements, etc. are also presented in these guidance materials.

Further, 95 percent wind coverage at 10.5 knots was considered to safely accommodate light aircraft requirements. These design characteristics were used to develop potential Seaplane Landing Areas as illustrated in **Figure 5-5.** This alternative includes a seaplane landing area located southeast of the Runway 29 end oriented in a northwest-southeast direction (13-31) which provides 95 percent wind coverage (Seaplane Landing Area Alternative A). Another potential landing area was shown north of Runway 29 oriented in a northeast and southwest direction (Seaplane Landing Area Alternative B). Although an existing dredged channel is located on the northern side of the airport's peninsular landmass that may better accommodate seaplane traffic on and off the airport property, the Runway 2-20 orientation does not accommodate 95 percent wind coverage. In

addition, based upon survey data of the area, the water depth is not conducive to a seaplane landing area based upon the requirements outlined in **FAC 16-60.007**. As a result, Alternatives 2 and 3 will continue to evaluate a seaplane landing area to the south of Runway 29 in a 13-31 orientation.

Land Acquisition

In order to conduct the recommended RSA improvements, Alternative A includes the acquisition or easement of approximately 0.33 acres of submerged property within the Intracoastal Waterway (Newfound Harbor). No additional property acquisition is included under Alternative 1.

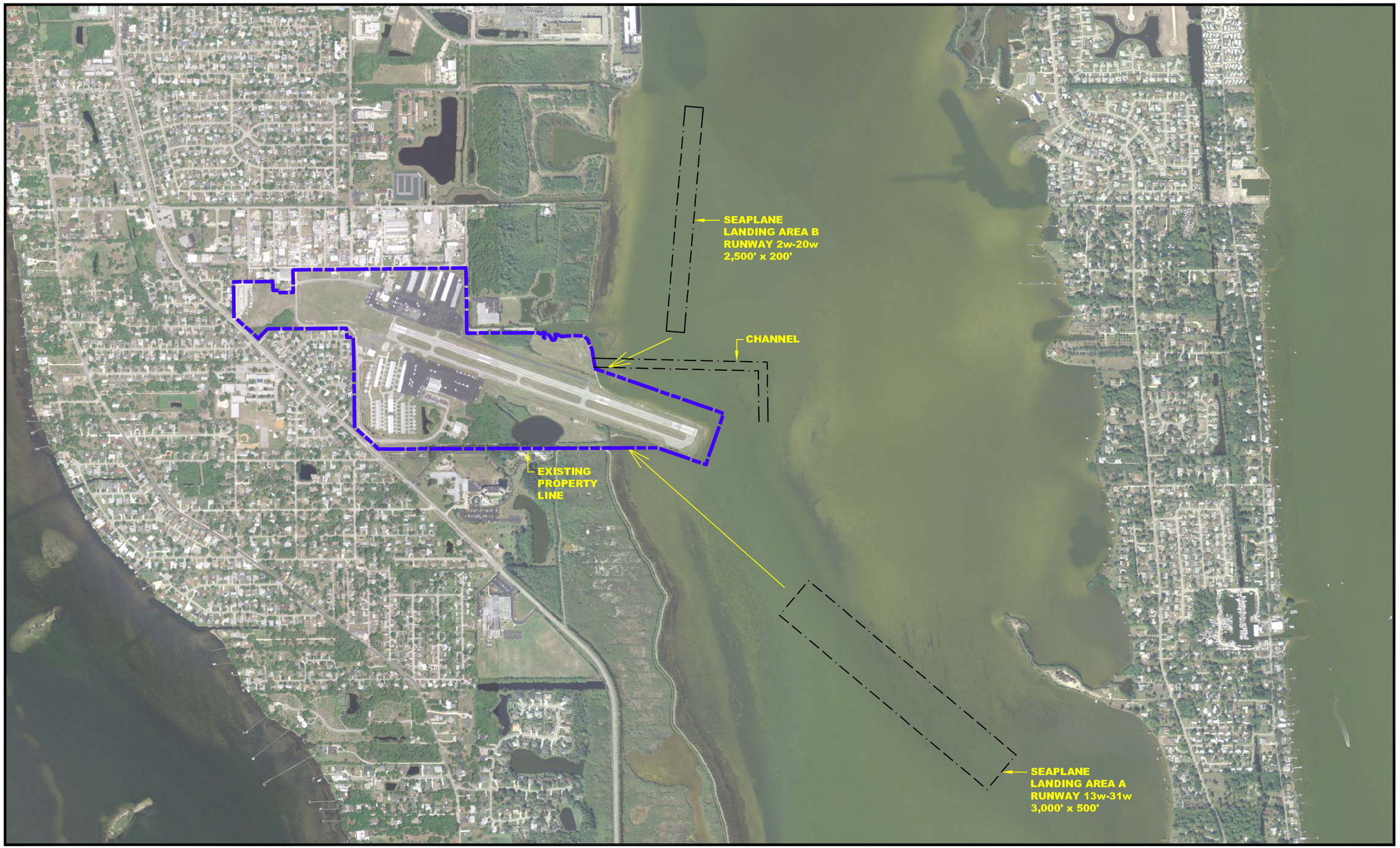
Order of Magnitude Cost Estimates

Order of magnitude costs for Alternative 1 are shown in **Table 5-6** below. Note that the costs do not include mitigation for potential wetland or other environmental impacts unless indicated. If these projects are implemented at COI, funding could be expected from various public and private sources (e.g., FAA, FDOT, the Authority, or private business). The strengths and weaknesses associated with this alternative are highlighted in **Table 5-7**. As mentioned earlier, **Figure 5-3** illustrates the proposed layout of Alternative 1 – Demand Based Development.

Table 5-6
Order of Magnitude Costs
Alternative 1 – Demand Based Development Alternative

Project	Estimated Cost
RSA & Seawall Improvements	$6,720,000
Sheriff's Apron Marking & Signage	$17,500
Retention Pond Expansion	$250,000
REILs (both runway ends)	$4,000
Relocate Windcone and Segmented Circle	$120,000
Expand South Apron including Seaplane Apron	$5,200,000
Expand T-Hangars on North Apron (13 T-Hangar Bays)	$1,700,000
Replace Port-A-Ports (21 T-Hangar Bays)	$2,875,500
Develop Three New T-Hangars on South Side (22 T-Hangar Bay)	$2,800,000
Develop T-Hangar on South Apron (11 T-Hangar Bays)	$1,500,000
Develop 14,000 SF Hangar/Office and Building Demolition	$3,400,000
Develop 6,000 SF Box Hangar and Building Demolition	$1,500,000
Develop 12,000 SF Seaplane Hangar	$2,800,000
Seaplane Ramp and Taxiway	$600,000
Remove Old Fuel Tanks & Install New Fuel Farm	$1,060,000
Alternative 1 – Order of Magnitude Costs	**$30,547,000**

Source: The LPA Group Incorporated, 2008



LPA	Merritt Island Airport Master Plan Update	SEAPLANE LANDING AREA EXHIBIT	0' 500' 1,000' SCALE: 1" = 1,000'		DATE 04/21/2009 5-5 FIGURE NO.

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Table 5-7
Alternative 1 – Strengths and Weaknesses

Strengths	Weaknesses
Minimal development requires minimal cost investment.	No provisions for unforeseen demand and future non-aviation opportunities.
Future forecast demand is accommodated throughout the planning period	Development impacts existing stormwater areas
Straightforward planning option.	Potential environmental impacts related to seaplane ramp – Mangroves and RSA/Seawall improvements
	No improvements planned for to increase capacity or to improve airfield circulation.
	Vacant airport land not allocated for future use.

Source: The LPA Group Incorporated, 2008

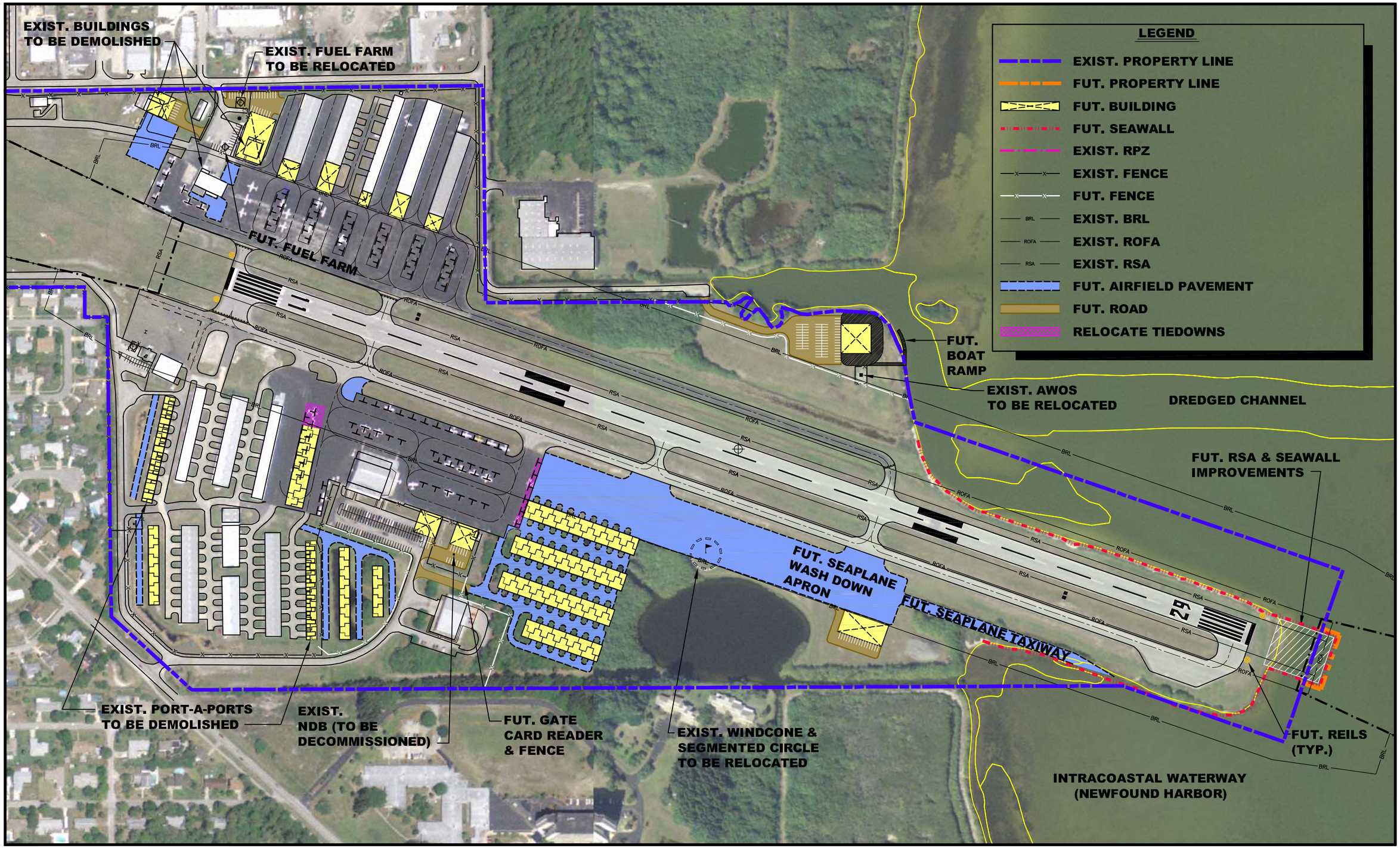
ALTERNATIVE 2 – LIMITED DEVELOPMENT

Alternative 2 takes a semi-optimistic approach to developing the airport during the twenty-year planning period by assuming that aviation growth would supersede the forecasts presented in **Chapter 3**, *Forecasts of Aviation Activity*, essentially building upon the development previously described under Alternative 1. This alternative further utilizes the existing developable airport property while remaining cognizant of sensitive environmental features, and provides for facilities desired by users such as a restaurant and seaplane facilities. The following sections describe the various improvements associated with Alternative 2 which is illustrated in **Figure 5-6**.

Airside Development

Seawall and Runway Safety Area
As previously described under Alternative 1, RSA Alternative B, RSA fulfillment using dredge and fill, was identified as the preferred RSA concept for COI. Therefore, Alternative 2 depicts RSA Alternative B, with no additional RSA improvements needed during the planning period.

Taxiways
Similar to Alternative 1, Alternative 2 includes connections to Taxiway A, at Connector Taxiways A3 and A4, as part of the south apron expansion depicted in **Figure 5-6**, thus allowing for efficient access between the runway and expanded south apron. This could, potentially result in some increased airfield capacity by allowing aircraft to exit the runway and immediately enter a new apron development at key rollout points (1,550 feet and 2,300 feet after landing on Runway 11; 1,300 feet and 2,050 feet after landing on Runway 29). Additionally, since no straight access is currently provided between Runway 11-29 and the south apron, a modification to Connector Taxiway A2 is included under this alternative to provide unencumbered aircraft ingress/egress.



LPA	Merritt Island Airport Master Plan Update	ALTERNATIVE 2	0' 150' 300' SCALE: 1" = 300'	DATE 04/21/2009 5-6 FIGURE NO.

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As previously illustrated in **Figure 5-4** and discussed under Alternative 1, modifications to the Sheriff's apron should also be conducted to prevent civilian aircraft from entering the area and interfering with emergency helicopter operations. The modifications may include removal of taxiway markings and lighting, as well as the installation of "No Entry" signs.

Lighting and NAVAIDS

Alternative 2 also includes the provision of REILs on either end of Runway 11-29 to provide enhanced visibility of the runway during nighttime and low-visibility approaches. Further as illustrated in **Figure 5-6**, relocation of the windcone and segmented circle would be needed to accommodate the expansion of the south apron. Additionally, with construction of two conventional/corporate hangars adjacent to the south apron, east of Space Coast Aviation's terminal building, relocation of the Non-Directional Beacon (NDB), which is used to fly a non-precision instrument approach to Runway 11, may be necessary. Although based on discussions with airport tenants at the time of this writing, the NDB has been inactive for several months because of required maintenance. As a result, the long-term requirements for the NDB facility at COI should be considered by the FAA. Lastly, development of a restaurant on the northeast corner of the airport property would require the relocation of the Airport Weather Observation System (AWOS-3). The refined alternative (**Figure 5-10**) and Airport Layout Plan set depict potential relocation sites for lighting and NAVAID facilities impacted by the proposed development at COI.

Aprons (tie-downs)

As described under Alternative 1, no apron (tie-down) space deficits were identified during the twenty-year planning period. However this conclusion was contingent on forecast aircraft storage demand, including the current hangar waiting list, being satisfied by new development. Therefore, Alternative 2 includes the same modest expansion of the south apron as Alternative 1 – the western half of the apron illustrated in **Figure 5-6** is intended for aircraft tie-downs; the eastern half is intended for seaplane parking. The purpose of this apron expansion is to accommodate the development proposed under Alternative 2, by providing a tie-down location for aircraft during construction/replacement of hangars on the north and south sides of the airport. Additionally, since this apron development may be eligible for federal funding, it would clear the way for future development on the south side of the airport, such as the illustrated T-hangar development. Relocation of the windcone and segmented circle would be necessary to accommodate this development.

Landside Development

Hangars

In addition to the hangar development previously described under Alternative 1, Alternative 2 includes new T-hangar and conventional/corporate hangar development on the south side of the airport. As illustrated in **Figure 5-6**, the development of two 6,000 square foot conventional/corporate hangars along the southeastern edge of the south apron is included under Alternative 2. Generally speaking, these types of conventional/ corporate hangars would cater to businesses that own a couple turboprops or small jets, or for some other specialty airport business (e.g., aircraft charter), due to their higher lease rates compared to other aircraft storage methods. A new T-hangar development is also depicted on the south side of the airport, just east of the existing south apron, which includes approximately 66 new aircraft T-hangar bays. This T-hangar concept was designed by the airport's engineer, Airport Engineering Co., Inc., and was considered the preferred layout for short-term T-hangar development at COI by the Authority and airport tenants. Subsequently the FDOT has allocated funding for some of the construction costs associated with this T-hangar development over a multi-year development period. Prior to development, a comprehensive investigation of potential environmental impacts and refined cost estimates will be conducted. It is noted, however, that some wetland impacts may result from the depicted T-hangar development and that additional stormwater retention features will be needed, including the expansion of the retention pond east of the proposed T-hangar development to accommodate the increased impervious pavement surface, which is currently being conducted at the airport. Overall, approximately 119 new aircraft T-hangar bays could be provided at COI with the full implementation of Alternative 2, thus exceeding the identified requirement of 53 bays for the twenty-year planning period.

Terminal

Space Coast Aviation's 12,000 square foot terminal and hangar facility exceeds the long-term terminal space requirement of 9,750 square feet. Therefore, Alternative 2 does not depict any terminal development; although areas around the terminal should be reserved incase Space Coast Aviation ultimately needs to expand to accommodate their business needs.

Automobile Parking

In order to accommodate the demands of airport users, Alternative 2 includes new automobile parking facilities with the development illustrated in **Figure 5-6**. It is anticipated that these individual automobile parking facilities for each new development could accommodate expected demand throughout the planning period.

Fuel Storage

Alternative 2 includes the replacement of the existing underground fuel storage tanks at COI, which are located near the north entrance of the airport, with aboveground 100 LL (avgas) and Jet-A fuel tanks along the same entrance road, as depicted in **Figure 5-6**. Consistent with the requirement identified in **Chapter 4**, each new aboveground fuel tank

should provide a minimum capacity of 10,000 gallons to accommodate an average two-week supply for airport operations throughout the twenty-year planning period. From an access standpoint, it would be less costly to upgrade the north side of the airport, rather than the south side, to allow for a fuel tanker to efficiently maneuver when making a fuel delivery. However, because this new fuel tank site would occupy a large portion of the existing automobile parking area, other remote locations on the airport property may be more suitable. Furthermore, according to the *Transportation Security Administration's (TSA's) Security Guidelines for General Aviation Airports* (May 2004), fuel farms are normally placed in a remote airport locations to provide adequate safety, including fire protection, and security. Costs associated with the proposed fuel farm include fencing, lighting and access control.

Roadways, Access, and Signage

Like Alternative 1, Alternative 2 also depicts new development entirely on the existing airport property which satisfies all of the identified requirements in **Chapter 4** and maximizes the developable airport property before additional property acquisition would have to be considered (as shown in Alternative 3). However, as mentioned earlier, airfield signage improvements should be considered to prevent aircraft from entering the Sheriff's apron, thereby preventing a potentially hazardous scenario.

Non-Aviation Use

Based on discussion with the Authority and airport tenants, there is considerable interest in developing a restaurant that overlooks the Intracoastal Waterway (Newfound Harbor) which could be accessed by automobiles, boats, aircraft, and seaplanes. Such a restaurant facility would be ideal for the airport because of the high number of aircraft operations and on-airport businesses, proximity to businesses, residential development and the Intracoastal, as well as year-round warm climate. For these reasons, it is anticipated that a restaurant at COI may be a popular attraction as well as provide an additional source of revenue to the Authority which may be used for future aviation development.

Two possible on-airport sites were considered: the northeast corner and the southeast corner. The southern property would be located south of the proposed seaplane taxiway and east of the Intracoastal Waterway. However, surface access to this portion of the property is difficult and to allow boat access would require removal of the existing mangrove trees along the southern portion of the property. Whereas placing the restaurant on the northern corner of the airport property will allow ease of surface and waterway access.

As illustrated in **Figure 5-6**, access to the restaurant would be from Wall Street and the restaurant would be located on the point overlooking the Intracoastal. A boat dock was also illustrated to allow for river access. The proposed restaurant provides waterfront access, and could accommodate two levels with outdoor patio and balcony seating. A proposed boat dock could be located on the northern point of the airport property connecting to the existing dredged channel, thereby allowing boat access to the restaurant

facilities. The proposed restaurant and boat facilities would be separated from the operational airfield via a 8 foot perimeter fence

However, this development, specifically the boat docks in the Intracoastal, may potentially impact manatee and sea grass habitats which are known to occur in the area. For that purpose, the boat docks were positioned facing east to avoid areas where manatee deaths have been documented, and along the existing dredged channel to avoid potential sea grass impacts. Further, depending upon the ultimate size and configuration of the restaurant development, relocation of the AWOS-3 may be necessary to prevent false readings by the weather sensors. Relocation of the airport fence would also be required to prevent access to the airfield and hangar areas.

Seaplane Operations

As illustrated in **Figure 5-6**, Alternative 2 includes the same facilities as Alternative 1 to support a potential seaplane landing area in the Intracoastal Waterway (Newfound Harbor), including a seaplane launch ramp, 12,000 square foot hangar, and parking apron. The seaplane facility development under Alternative 2 is positioned in the southeast corner of the airport property, opposite the restaurant facility, to avoid potential interference with the boat docks and boat traffic, and would therefore include Seaplane Landing Area Alternative A as previously shown in **Figure 5-5**. However, since a dredged channel already exists in the Intracoastal that leads to the northeastern corner of the airport property, Alternative 3 evaluates seaplane facility development that utilizes the path of the existing dredged channel.

Land Acquisition

In order to conduct the recommended RSA improvements, Alternative 2 includes the acquisition or easement of approximately 0.33 acres of submerged property within the Intracoastal Waterway (Newfound Harbor). No additional property acquisition is included under Alternative 2.

Order of Magnitude Cost Estimates

Order of magnitude costs for Alternative 2 are shown in **Table 5-8** below. Note that costs do not include mitigation for potential wetland or other environmental impacts unless indicated. If these projects are implemented at COI, funding could be expected from various public and private sources (e.g., FAA, FDOT, Authority, or private business). The strengths and weaknesses associated with this alternative are highlighted in **Table 5-9**. **Figure 5-6** illustrates the proposed layout of Alternative 2 – Limited Development.

Table 5-8
Order of Magnitude Costs
Alternative 2 – Limited Development

Project	Estimated Cost
RSA & Seawall Improvements	$6,720,000
Sheriff's Apron Marking & Signage	$17,500
Retention Pond Expansion	$250,000
REILs (both runway ends)	$4,000
Reconfigure Taxiway A2	$10,500
Relocate Windcone and Segmented Circle	$120,000
Expand South Apron and construct Seaplane Washdown Apron	$5,200,000
Expand T-Hangars on North Apron (13 T-Hangar Bays)	$1,700,000
Replace Port-A-Ports (21 T-Hangar Bays)	$2,875,500
Develop Three New T-Hangars on South Side (22 T-Hangar Bay)	$2,800,000
Develop T-Hangar on South Apron (11 T-Hangar Bays)	$1,500,000
Develop 14,000 SF Hangar/Office and Building Demolition	$3,400,000
Develop 6,000 SF Box Hangar and Building Demolition	$1,500,000
Develop 12,000 SF Seaplane Hangar	$2,800,000
Seaplane Ramp and Taxiway	$600,000
Remove Old Fuel Tanks & Install New Fuel Farm	$1,060,000
Develop Four New T-Hangars on South Side (66 Bays)	$17,692,000
Develop Two 6,000 SF Box Hangars on South Side	$2,856,000
Relocate NDB	$100,000
Restaurant and Parking Area	$12,700,000
Boat Ramp	$125,000
Relocate AWOS	$206,000
Alternative 2 – Order of Magnitude Costs	**$64,236,500**

Source: The LPA Group Incorporated, 2008

Table 5-9
Alternative 2 – Strengths and Weaknesses

Strengths	Weaknesses
Unanticipated demand is accommodated throughout the planning period.	Potential for high environmental impacts from T-hangar development.
Nearly all of the developable airport property is allocated for future use.	Relocation of several NAVAIDs required.
Incorporates seaplane and restaurant facilities.	Ineffective layout for seaplane facilities.

Source: The LPA Group Incorporated, 2008

ALTERNATIVE 3 – UNCONSTRAINED DEVELOPMENT

Alternative 3 takes an aggressive approach to future airport development, as depicted in **Figure 5-7**. This option assumes that aviation activity and future business opportunities will far exceed previously anticipated growth scenarios. All land that can reasonably be developed within the airport's boundaries was considered in this plan and additional land acquisition was recommended to increase the airport's developable acreage. Proposed development is contingent upon future demand and available funding. Since Alternative 3 expands upon development outlined in Alternatives 1 and 2, only those developments which differ are described in this section.

Landside Development

Hangars

In addition to the hangar development previously described under Alternative 2, Alternative 3 includes the acquisition of approximately 28.36 acres of property directly northeast of the airport, along Kemp and Wall Streets, for future aviation development (T-hangars, conventional/corporate hangars, training facility, etc.). As illustrated in **Figure 5-7**, development in this area would require the relocation of Kemp and Wall Streets, as well as the demolition of an approximately 45,000 square foot industrial facility. Subsequently, the costs associated with acquiring and developing this property may be high, and potential environmental features may seriously limit the amount of property that could be developed. Thus a thorough investigation of the illustrated acquisition area should be conducted, including wetland review, property appraisal, environmental site assessment, etc., to determine the viability of this property for future aviation and non-aviation development.

Seaplane Operations

Locating the seaplane facilities along the northern portion of the existing airport property, as illustrated in **Figure 5-7**, allows the use of the existing dredged channel thereby limiting potential environmental impacts associated with protected flora and fauna. The proposed seaplane development includes a launch ramp, 12,000 square foot hangar, and apron.

Under Alternative 3, the seaplane landing would be located south and east of the existing airport property within the Intracoastal Waterway (Newfound Harbor). The proposed alignment of 13-31 provides greater than 95 percent wind coverage at 10.5 knots and is located within the deeper portion of the existing waterway. This allows aircraft greater maneuverability, will allow aircraft to utilize the dredged channel, and limits potential seagrass impacts. Although located slightly south of Runway 29, the proposed seaplane landing area's proximity to either the NASA Shuttle Landing Facilities or Patrick Air Force Base is negligible to expected seaplane operations.

EXIST. BUILDINGS TO BE DEMOLISHED

EXIST. FUEL FARM TO BE RELOCATED

FUT. AVIATION DEVELOPMENT

EXIST. BUILDING TO BE DEMOLISHED

FUT. FUEL FARM

FUT. SEAPLANE WASH DOWN APRON

FUT. SEAPLANE TAXIWAY

FUT. BOAT RAMP

EXIST. AWOS TO BE RELOCATED

DREDGED CHANNEL

FUT. RSA & SEAWALL IMPROVEMENTS

EXIST. PORT-A-PORTS TO BE DEMOLISHED

EXIST. NDB (TO BE DECOMMISSIONED)

FUT. GATE CARD READER & FENCE

FUT. REILS (TYP.)

INTRACOASTAL WATERWAY (NEWFOUND HARBOR)

LEGEND

- EXIST. PROPERTY LINE
- FUT. PROPERTY LINE
- FUT. BUILDING
- FUT. SEAWALL
- EXIST. RPZ
- EXIST. FENCE
- FUT. FENCE
- EXIST. BRL
- EXIST. ROFA
- EXIST. RSA
- FUT. AIRFIELD PAVEMENT
- FUT. ROAD
- RELOCATE TIEDOWNS

LPA	Merritt Island Airport Master Plan Update	ALTERNATIVE 3	0' 150' 300' SCALE: 1" = 300'		DATE 04/21/2009 5-7 FIGURE NO.

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Land Acquisition

In addition to the acquisition or easement of approximately 0.33 acres of submerged property within the Intracoastal Waterway (Newfound Harbor) for the recommended RSA improvements to Runway 29, Alternative 3 also includes the acquisition of approximately 28.36 acres of property directly northeast of the airport. This property, located north of Wall Street and East of Kemp Street could be used for aviation related development (i.e. hangars), non-aviation development (i.e. community waterfront park) and for potential wetland mitigation.

Order of Magnitude Cost Estimates

Order of magnitude costs for Alternative 3 are shown in **Table 5-10** below. Note that the costs do not include mitigation for potential wetland or other environmental impacts unless indicated. If these projects are implemented at COI, funding could be expected from various public and private sources (e.g., FAA, FDOT, the Authority, or private business). The strengths and weaknesses associated with this alternative are highlighted in **Table 5-11**. **Figure 5-7** illustrates the proposed layout of Alternative 3 – Unconstrained Development.

Table 5-10
Order of Magnitude Costs
Alternative 3 – Unconstrained Development Alternative

Project	Estimated Cost
RSA & Seawall Improvements	$6,720,000
Sheriff's Apron Marking & Signage	$17,500
Retention Pond Expansion	$250,000
REILs (both runway ends)	$4,000
Reconfigure Taxiway A2	$10,500
Relocate Windcone and Segmented Circle	$120,000
Expand South Apron (in front of T-Hangars)	$1,400,000
Expand North Apron	$4,300,000
Expand T-Hangars on North Apron (13 T-Hangar Bays)	$1,700,000
Replace Port-A-Ports (21 T-Hangar Bays)	$2,875,500
Develop Three New T-Hangars on South Side (22 T-Hangar Bay)	$2,800,000
Develop T-Hangar on South Apron (11 T-Hangar Bays)	$1,500,000
Develop 14,000 SF Hangar/Office and Building Demolition	$3,400,000
Develop 6,000 SF Box Hangar and Building Demolition	$1,500,000
Develop 12,000 SF Seaplane Hangar	$2,800,000
Seaplane Taxiway and Ramp	$400,000
Remove Old Fuel Tanks & Install New Fuel Farm	$1,060,000
Develop Four New T-Hangars on South Side (66 Bays)	$17,692,000
Develop Two 6,000 SF Box Hangars on South Side	$2,856,000
Relocate NDB	$100,000
Restaurant and Parking Area	$12,700,000
Boat Ramp	$125,000
Relocate AWOS	$206,000
Future T-Hangar Development and Building Demolition	$3,500,000
Acquisition of Private Property (28.36 Acres) - Appraised Value	$7,000,000
Relocate Kemp and Wall Streets	$530,000
Alternative 3 – Order of Magnitude Costs	**$75,566,500**

Source: The LPA Group Incorporated, 2008

Table 5-11
Alternative 3 – Strengths and Weaknesses

Strengths	Weaknesses
Identifies potential off-airport development opportunities should the need arise.	Most costly development alternative.
Provides an effective layout for the seaplane and restaurant facilities.	Development causes the largest number of environmental impacts.
	Relocation of several NAVAIDs required.

Source: The LPA Group Incorporated, 2008

REFINED/SELECTED ALTERNATIVE

In order to determine the refined/selected alternative for COI, which represents the preferred development concept for the airport throughout the duration of the twenty-year planning period, a comprehensive review/coordination process between the Authority, FAA, FDOT, TAC, and public was undertaken. As a result, a combination of elements from each of the three prior concepts presented was incorporated into the selected alternative to serve as the framework for future development. The three alternatives are evaluated within this section to weigh the inherent strengths and weaknesses of each in comparison against the other. Concepts were evaluated within the following categories:

- Flexibility/Planning Requirements
- Phasing/Construction
- Operational Performance and Safety Considerations
- Off Airport Land Use and Airport Zoning
- Noise and Noise Notice Zones
- Environmental Impacts
- Stormwater and Drainage Requirements
- Community Recommendations/Acceptance

Flexibility/Planning Requirements

In general, this pertains to the total growth potential, including demand, safety and security requirements, and design standards, the ability to accommodate unforeseen changes, as well as ability to conform to local, regional and state transportation planning efforts. For example, while Alternative 1 provides the minimum amount of facilities to satisfy forecast demand, it does not provide for unforeseen growth at COI like Alternatives 2 and 3. All three alternatives are consistent with regional goals and transportation efforts, since they maintain the character of the airport as serving small general aviation aircraft, with no provisions for runway development or other features that would be incompatible with the surrounding community. For these reasons, a phased development plan is necessary for the airport property, with the last resort being the need for additional property acquisition.

Phasing/Construction

The evaluation criteria primarily associated with this category include: the ability to phase construction and expand incrementally, the costs associated with construction, impacts to existing facilities, and any engineering difficulties anticipated as part of the build-out. For all three alternatives, the initial development concern includes the RSA and seawall improvements which are needed to address FAA design standards and to prevent further erosion of the airport's coastal boundary. Besides the RSA project, any project that would increase impervious/paved surface at COI would present unique challenges due to the limited space for expanded drainage/retention features. As a result, sites must be carefully selected, with appropriate engineering and environmental analysis, prior to development. Additionally, blending critical needs of the airport, such as T-hangar development, with desires, such as a restaurant development, must be carefully weighed and effectively developed to minimize impacts.

Operational Performance and Safety Considerations

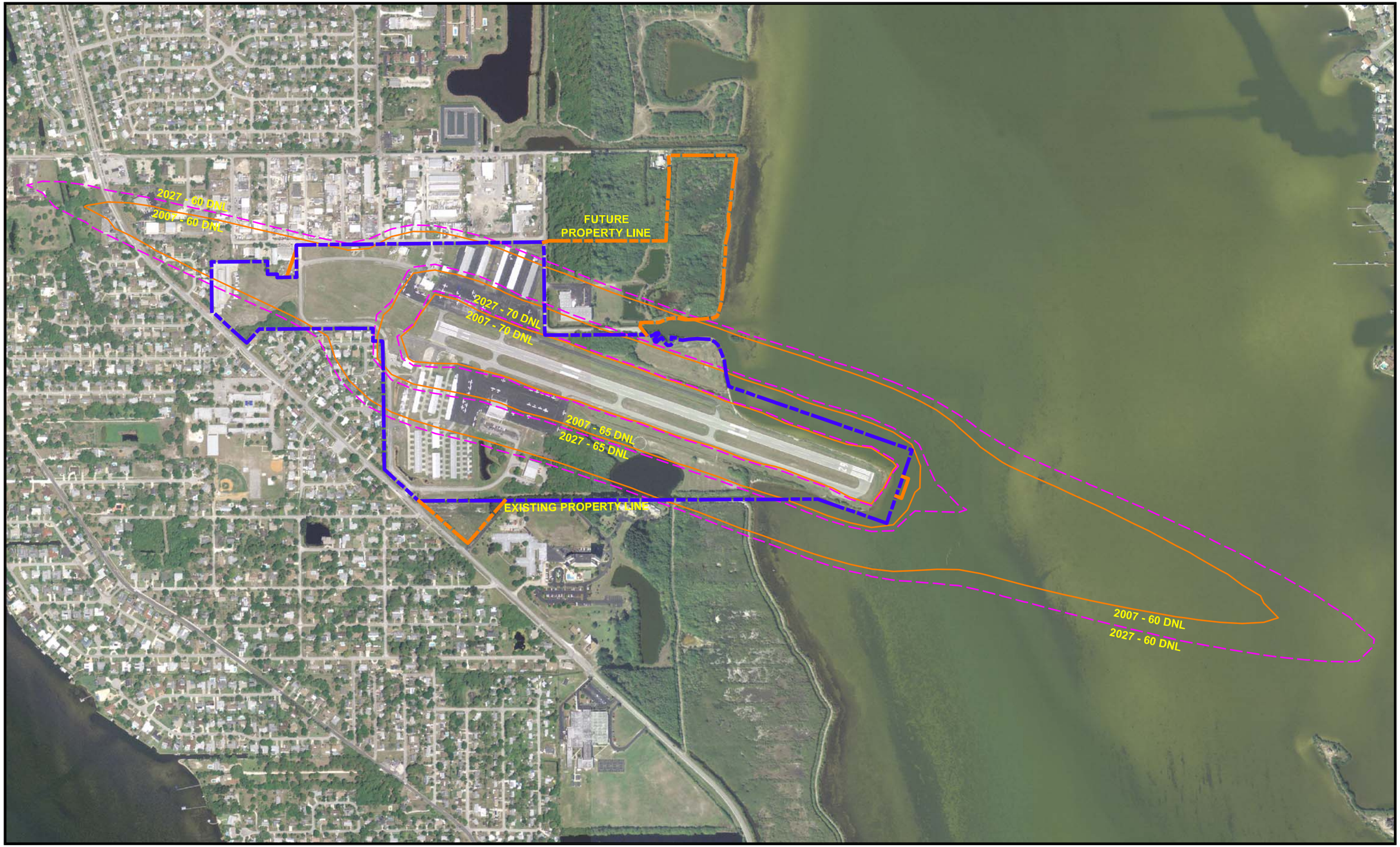
Operational performance compares the overall operational efficiency of the proposed airfield layouts based upon compatibility with long-range airfield demand as well as FAA airport design requirements. As mentioned earlier, RSA and seawall improvements are the most critical need of the airport. Additionally, the ARC for Runway 11-29 was identified as B-I light, due to the anticipated decrease in larger B-II aircraft operations and inability of the airport to meet B-II design standards (e.g., runway-taxiway offset). Efforts to enhance the safety of the airport for all potential users, even occasional B-II aircraft, was an important part of the alternatives evaluation; for this reason, maintaining above-standard runway and taxiway widths, as well as FAR Part 77 Imaginary Surfaces associated with non-precision instrumentation, were incorporated into all three alternatives. Since the airfield capacity is anticipated to reach the 60 percent threshold by 2012, the alternatives were designed with new connector taxiways and apron areas to increase the number of exit points from the airfield. Alternative 3 provides the most new connector taxiways and apron areas for this purpose.

Off Airport Land Use and Airport Zoning

Residential property is currently located approximately 400 feet beyond the end of Runway 11. Since no runway development is included under any of the alternatives, and no incompatible development is located within the Runway Protection Zones (RPZs), no issues related to off airport land use and zoning would be anticipated.

Noise and Noise Notice Zones

No impacts to noise sensitive land uses would be anticipated from any of the alternatives. Although, through natural activity growth at COI, one residential property has the potential to be impacted by incompatible airport noise exposure as illustrated in **Figure 5-8**. Noise contours were generated using the FAA's Integrated Noise Model (INM) Version 7.0. The one residential property is located within the Day-Night Average Noise Level (DNL) contour of 65 decibels (dB), which is considered incompatible with residential development. It is noted that any shift in the Runway 29 threshold to the northwest would result in further incompatible noise impacts to residential development, thus maintaining the current Runway 29 threshold location is considered important from a compatible land use standpoint.



LPA	Merritt Island Airport Master Plan Update	2007 & 2027 DNL NOISE CONTOURS	0 350' 700' RELATIVE SCALE		DATE 04/21/2009 5-8 FIGURE NO.

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Environmental Impacts

In evaluating all three alternatives, the minimal amount of construction shown in Alternative 1 will create the least amount of environmental impacts. As Alternatives 2 and 3 become increasingly more aggressive with development, environmental impacts become more of a development and cost factor. Alternative 3, the most aggressive development alternative, proposes the construction of multiple aviation and non-aviation facilities throughout the airport's property and also recommends the acquisition of additional land for development. For this reason, substantial environmental impacts may be encountered during this option. In order to address these impacts, environmental studies, relocation of protected species, and mitigation of wetland areas can all be expected during the pursuit of this alternative. However, since additional impacts under Alternative 3 are primarily associated with apron and hangar development beyond forecast demand, negating this proposed development would result in similar potential environmental impacts as identified in both Alternatives 1 and 2. In all three alternatives, environmental impacts were anticipated as a result of the recommended RSA and seawall improvements.

Stormwater and Drainage Requirements

As mentioned under Phasing and Construction, any increase in impervious surface associated with hangars, aprons, buildings, etc. would require the installation of additional stormwater treatment. According to the St. John's River Water Management District (SJWMD) rules concerning the removal of phosphorous and nitrogen from stormwater runoff to an Outstanding Florida Waterway, the following requirements must be met:

- **SJRWMD Criteria**
  1. Discharge: Post-development discharge shall be less than or equal to the pre-development discharge.
  2. Dry Retention Ponds: Treatment Volume – First 0.5 inches of runoff over the drainage area or 1.25 inches times the impervious area (excluding water bodies), whichever is greater.
  3. Additional Treatment Volume for On-line Retention: Requires an additional 50% of the above treatment volume.
  4. Additional treatment volume is required for systems which discharge directly to Class I, Class II, and Outstanding Florida Waters, or Class III waters which is that it provides either: an additional 50% of both the required treatment and permanent pool volumes, or pretreatment of the stormwater prior to the stormwater entering the dry retention pond by following the requirements for underdrains.
  5. Recovery: The entire treatment volume shall recover within 72 hours following a storm event.

- **National Pollutant Discharge Elimination System (NPDES) Criteria**

1. Effective sediment and erosion controls must be employed for construction activities that have one or more acres of exposed soils.

- **Water Quality**
  1. Since this project is located within the Indian River Lagoon basin, which is considered to be an impaired water body of the state for nutrients, total phosphorus and total nitrogen. Therefore, a pre- and post-development pollutant loading analysis is required. The water quality treatment volume or the pollutant loading volume, whichever is greater of the two will govern the required treatment necessary in the proposed ponds.

In evaluating potential stormwater treatment at COI, it was anticipated that expansion of the existing stormwater pond on the south side of the airport property could be used to accommodate planned development. However, in reviewing existing permitting information, it was found that expansion of the existing pond was denied due to its location to the aircraft operating areas (runways, taxiways, etc.).

Although Alternative 1 shows the minimal amount of required development as outlined in **Chapter 3**, *Aviation Activity Forecasts*, and **Chapter 4**, *Facility Requirements*, modifications to proposed development would still be required to accommodate existing drainage swales and treatment requirements. As a result, it was anticipated that the preferred development option, based upon Alternative 1, 2 or 3, would include some modifications to accommodate the November 2008 and February 2009 Stormwater Treatment requirements.

Community Recommendations/Acceptance

All airfield improvements presented in this chapter sought to enhance the overall safety of the airfield, while accommodating the desires and demands of its users. Recommended physical and operational improvements included: the Runway 29 RSA and seawall reconstruction, marking and lighting realignment including lighted signage adjacent to the Sheriff's Apron, the implementation of NOTAMs to minimize potential impacts of larger aircraft operations, development of a proposed seaplane facility as well as on-airport restaurant and boat dock. As a result, proposed development was consistent with the goals of the Authority as well as the requirements of the FAA and FDOT.

Both Alternatives 2 and 3 include proposed development recommended by the Authority's on-call engineer, Airport Engineering Co., Inc. Thus, development plans already in progress or approved by the Authority and the FAA were incorporated into the preferred development plan and airport layout plan set.

Evaluation Summary

Alternatives 1, 2 and 3 identify varying levels of development based upon short and long-term demand, the airport's current role within both the Titusville and Florida Aviation System, FAA design requirements and preliminary engineering work conducted. Although airfield development for all three alternatives was nearly identical, the

Authority and Technical Advisory Committee, based upon presentations in September and August, respectively, selected Alternative 3 as the base for the final long-term airport development with modifications for environmental and stormwater requirements.

Preferred Development Concept

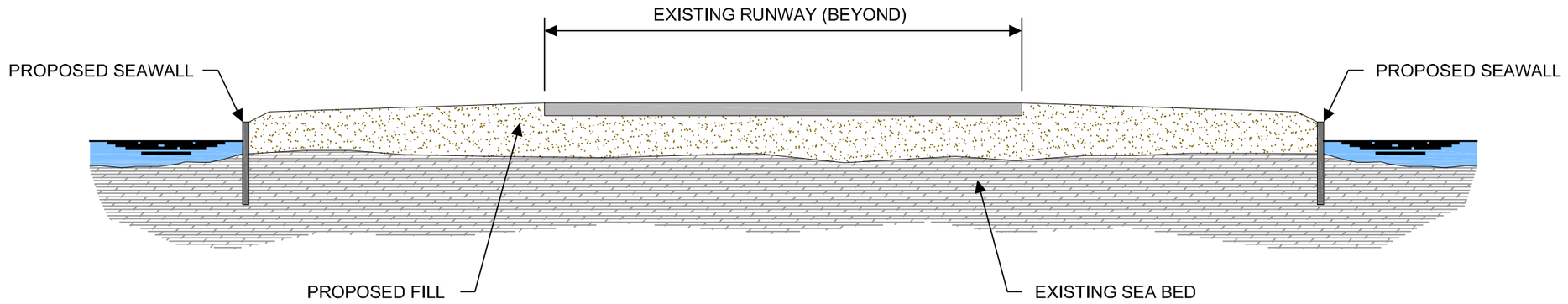
During the meetings with the Authority and TAC, several comments were recorded and subsequently incorporated into the Preferred Development Concept illustrated in **Figure 5-10**. As mentioned earlier, the Preferred Development Concept largely reflects Alternative 3 with modifications to accommodate stormwater/drainage, design and environmental requirements. Since reconstruction of the seawall and Runway 29 RSA are critical to the continued operation of COI, these two projects and associated design and environmental requirements should be scheduled for the short-term. Thus, some projects originally scheduled to occur in the short-term may be shifted to the intermediate or long-term based upon available funding. This is discussed in more detail within **Chapter 7**, *Implementation Plan*.

Based on the evaluation criteria established above, each portion of the Preferred Development Concept is described in the following sections including stormwater, environmental impacts and preliminary order of magnitude cost estimates.

RSA and Seawall Improvements

As presented in **Appendix E**, *Runway Safety Area Determination*, the preferred corrective measure for the Runway 29 RSA requires dredge and fill activity within the Intracoastal Waterway (Newfound Harbor) to reclaim the eroded RSA land area. However, to accommodate current ARC B-I light standards, an additional 0.22 acres of property will need to be acquired beyond the existing property line. Reconstruction of both the seawall and Runway 29 RSA were determined as the best course of action since it allows full use of the existing runway length, improves the overall stability of the airfield, limits noise impacts to the surrounding community and improves safety and long-term capacity.

Although the seawall north and south of Runway 29 would be located within the object free area of Runway 11-29, the top of the seawall would remain approximately 6 inches below the current object free area elevation as shown in **Figure 5-9**. Still, to protect the Runway 29 RSA from future erosion, the seawall should be constructed at a height either equal or slightly higher that the elevation of the RSA. Both projects, the reconstruction of the seawall and Runway 29 RSA were deemed a high priority by the Authority since maintaining the overall operating integrity, including existing runway length, and safety of the airport was the primary goal.



Merritt Island Airport
Master Plan Update

PROPOSED SEAWALL

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SCALE: 1" = 20'

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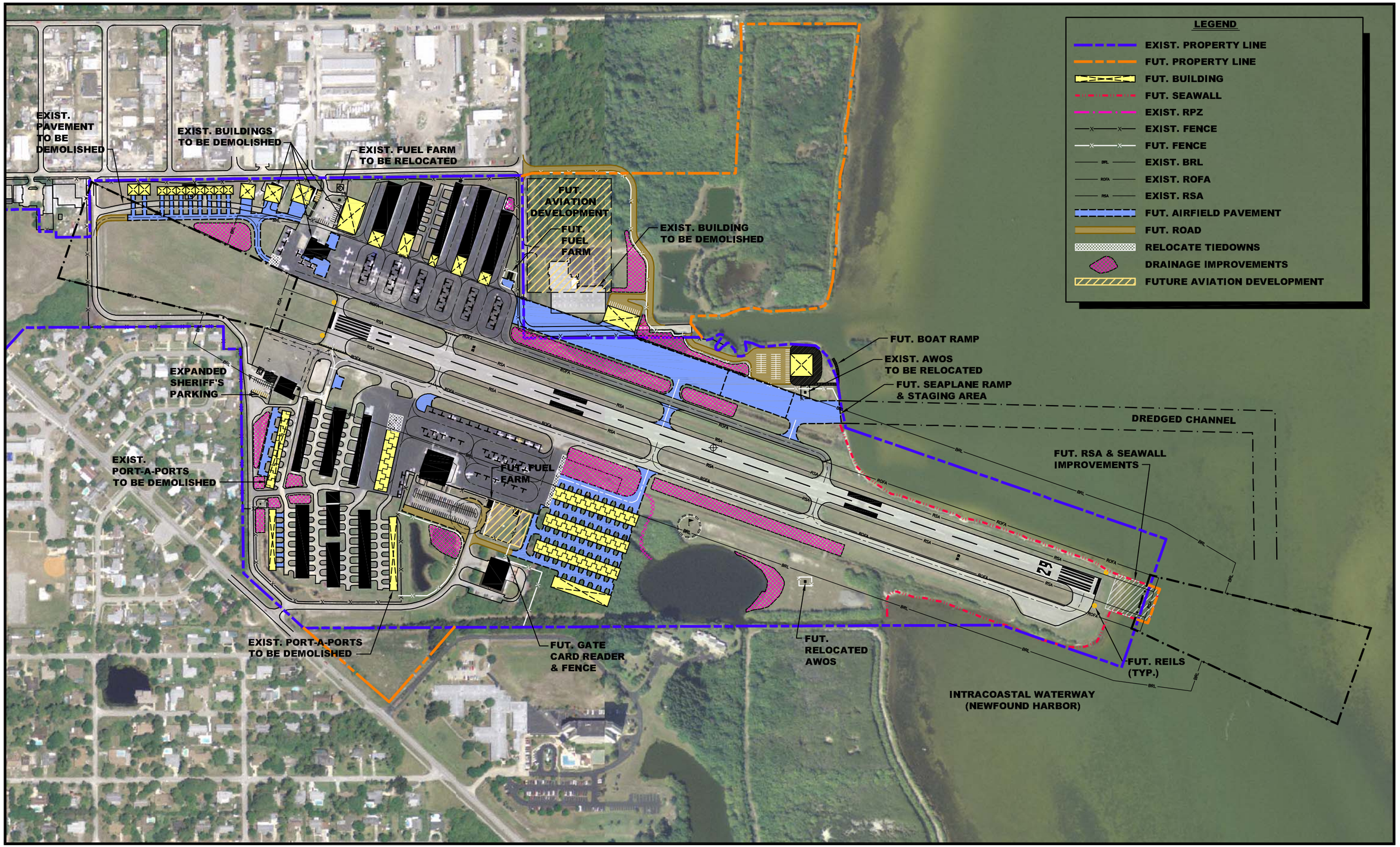

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Taxiways
Minor taxiway modifications were included in the Preferred Development Concept to improve the capacity and accessibility of the airfield. Besides the correction of the taxiway connection to the south apron (at Connector Taxiway A2) to provide straight access, another connector taxiway was incorporated based on comments from the TAC. As illustrated in **Figure 5-10**, Connector Taxiway B3 would provide another runway exit point while improving access to the north and south sides of the airfield. Additional taxiways include those associated with apron improvements to the north and the T-Hangar construction on the south side of the airfield. These improvements, as illustrated, provide efficient access in and around the airfield. Further to facilitate aircraft movement on the south side of the airfield, a 262 SY run-up pad is recommended east of Taxiway A-1.

Lighting and NAVAIDS
REILs are recommended for each runway end to provide enhanced visibility for nighttime and IFR operations. Also, since the Non-Directional Beacon (NDB) has not worked for several years and the airport is equipped with a GPS approach on Runway 11, it is recommended that the NDB be decommissioned. No other lighting or NAVAID improvements are required for the airport, although relocation of the AWOS-3 would be necessary for the proposed seaplane ramp/staging area and restaurant developments. As such, a potential relocation site is illustrated in the southeast corner of the airport; however the actual relocation site for the AWOS-3 would be determined by the FAA.

Aprons
The preferred development concept includes apron expansion and development primarily to the north side of the airfield. In conjunction with proposed hangar development on the northwest side of the airfield, various sized apron facilities dependent upon hangar and aircraft parking requirements should be developed. Additional apron development includes an expansion of the north apron to the east to accommodate future seaplane, hangar and tie-down facilities. Based upon the analysis provided in **Chapter 4**, *Demand Capacity/Facility Requirements*, if the illustrated hangar developments can be implemented at COI, no additional apron development should be necessary during the planning period, except for staging areas related to new hangar development.

Hangars
The preferred hangar development includes a mix of corporate/box hangars and T-hangars via a combination of expansion and new construction. The corporate/box hangar development on the north side of the airport and large T-hangar development on the south side were previously selected by airport tenants as preferred concepts, and much of the preliminary engineering and environmental work has already been conducted. Other hangar developments include expansion of existing buildings on the north and south aprons, as well as infilling open areas or replacing Port-a-Ports with T-hangars or box hangars. In order to avoid obstructions to the runway's FAR Part 77 Imaginary Surfaces, the Preferred Development Concept includes removal of aging facilities and replacement

with new buildings outside the BRL as shown in **Figure 5-10**. Additionally, automobile parking facilities are incorporated into each new hangar development.

Fuel Storage

During meetings with the Authority and TAC, information regarding approved aboveground fuel farm locations was provided. Two sites were approved: one on the north side east of T-Hangar 5, and one to the south northeast of the existing FBO (Space Coast) automobile parking facilities. Although the FBO, located on the south side of the airfield, has the primary contract for disbursement of fuel on the airport, the north side location was chosen by the Authority as the primary fuel farm location. This site will include spill containment, concrete pad, and two 10,000 gallon (Jet A and 100LL) tanks. The area will be equipped with required fencing as well as a card reader system. Access to this site could be obtained from the existing north entrance road or via Kemp Road to the east. The existing underground fuel farm will be removed and cleaned to allow expansion of the Voyager Flight School facilities as well as future corporate hangar development to the north.

The south fuel farm location was identified to accommodate potential facility expansion and long-term demand. This location adjacent to the FBO facilities and current NDB location requires the construction of a roundabout, which will impact existing FBO parking facilities. As a result, an expansion of the FBO parking to the south would replace lost parking. The south site will accommodate two additional 10,000 gallon tanks: 100LL and Jet A.

Like the primary fuel farm, this fuel location would also require spill containment, fencing, and controlled access. It is anticipated that the north fuel farm development would be constructed in the short-term, based upon the March 2009 FDOT Work Program, and the south fuel farm would be constructed in the long-term in conjunction with proposed facility expansion and anticipated long-term demand.

Surface Road and Parking Improvements

In conjunction with proposed development, additional parking facilities and road relocation would be required. Plans are already in progress to relocate the Northwest access road to the south to accommodate planned hangar development within the northwest corner of the airport. In conjunction with the relocation, an electronic security gate should be installed to limit airfield access on the north side of the airfield.

As noted in the FDOT Work Program, dated March 2009, and airport joint automated capital improvement program (JACIP), the airport access road and associated parking was planned for rehabilitation in 2008. Additional surface road improvements include:

- the relocation of Wall Street to provide access to the proposed corporate/seaplane hangar facilities and restaurant, and
- a portion of the existing Kemp Road would remain to provide access to the proposed north fuel farm site as well as access to planned hangar development to the east.

Parking in and around the Sheriff's hangar would be expanded to accommodate existing automobile parking demand as well as future demand related to the relocation of the Civil Air Patrol. At the time of this writing, the Civil Air Patrol facilities were being relocated to the former Sheriff's building adjacent to the new Sheriff's hangar, and the Authority was selling the existing trailer to provide room for future hangar development.

As mentioned, the FBO automobile parking would be expanded to the south to accommodate the south fuel farm roundabout allowing the FBO to maintain existing automobile parking capacity. Additional parking associated with new hangar development as well as the proposed restaurant development was also incorporated in the refined alternative and preliminary cost estimates.

Seaplane Base

In evaluating the preferred location for seaplane operations on the airport property, including the placement of the seaplane ramp, apron, and landing area, accessibility was established as the key criteria in addition to wind coverage. As depicted in **Figure 5-10**, the Preferred Development Concept incorporates seaplane facility development in the northeast corner of the airport property. By allowing seaplanes to utilize the existing dredged channel in the Intracoastal Waterway (Newfound Harbor) to access the seaplane ramp, potential environmental impacts and permitting requirements associated with dredging a new navigational channel could be avoided.

A seaplane landing area located to the south of Runway 29, as illustrated in **Figure 5-5**, designed in a 13-31 orientation allows for 95 percent wind coverage at 10.5 knots and places the seaplane landing area within the deepest section of the Intracoastal Waterway. Further, providing a landing area of 3000 feet x 500 feet allows small seaplanes greater flexibility and wind coverage. The location and orientation of the proposed seaplane landing area centerline was designed to provide direct access to the existing dredged canal, which again facilitates the movement of aircraft within the Intracoastal Waterway. Although the landing area is located south of Runway 29, operations would unlikely be impacted by restricted airspace associated with Patrick Air Force Base. Further, operations at COI are already temporarily restricted during space shuttle or rocket operations; it is unlikely that this will change in the future. Overall, this seaplane facility layout provides efficient connection to the entire airfield, via a stub connection to Taxiway B, includes a parking apron adjacent to the preferred restaurant site, and would be accessible via Kemp and Wall Streets. If the adjacent property was acquired, demolition of the existing facilities and construction of a seaplane and other hangar facilities could be provided. However, as part of the proposed restaurant and north apron development, relocation of the existing AWOS-3 would be required.

Restaurant Development

To accommodate the desires of airport users, the alternatives analysis identified a potential location for restaurant development in the northeast corner of the airport property, on the point (land feature) overlooking the Intracoastal Waterway (Newfound

Harbor). The northeast corner of the airport property was determined to be most accessible. Surface access could be obtained via Kemp and Wall Streets, and boat traffic via the dredged canal and proposed dock. The addition of an on-site restaurant would draw additional traffic to the airport and provide an additional revenue source to the Authority. The proposed restaurant development would include adjacent paved parking, a two-story building with covered outdoor patio and balcony seating, boat ramp/dock surrounded with 6-foot fence to separate the restaurant from the airfield proper. As previously mentioned, relocation of the AWOS-3 would be necessary to accommodate proposed development.

Property Acquisition

As part of the Runway 29 RSA reconstruction approximately 0.22 acres of submerged property beyond the existing airport property boundary would need to be acquired to obtain standard B-I light runway safety area design requirements (120 x 240 feet) as well as accommodate the installation of the seawall. Also, based upon the FDOT Work Program and JACIP for COI, the Authority has expressed interest in obtaining the contiguous property north of the airfield, which includes two parcels of property owned by Mary McLeod consisting of 12.89 and 15.47 acres, respectively. Although a large portion of the property is currently designated as wetlands based upon the *Florida Land Use, Cover, and Forms Classification System* (FLUCFCS), the current owner will not break-up the property. As a result, the Authority has considered developing the eastern portion of the property as a community park and beach and using the western portion for future aviation development. Aviation development on this portion of property would be beyond the twenty-year forecast requirements as identified in **Chapter 4** of this report. Further, the owner of the property south of Airport Road along the western portion of the airfield, Mr. Arthur Li, has expressed interest in selling his 2.44 acres of property to the Authority. This would allow continued aviation expansion to the south while limiting potential stormwater impacts.

Stormwater Requirements

Due to expanded volume treatment guidelines related to stormwater drainage, discharge and recovery specifically related to the removal of phosphorous and nitrogen from stormwater runoff to an outstanding Florida waterway, proposed development as outlined in Alternative 3 was modified to account for stormwater treatment and recovery. In reviewing existing stormwater treatment locations on the airfield, permits were initially pulled with regard to expanding the existing drainage pond on the south side of the airfield. According to the permit data, the FAA, at the time, did not accept the application to expand the pond due to wildlife concerns. However, based upon discussions between airport management and FAA Airport Districts Office, expansion of the existing pond was reconsidered. Further, it was recommended that the clean dirt obtained from the pond dredging could be used to develop the proposed south T-hangar development. Further, because of treatment and wildlife requirements, portions of the airport property were designated as dry ponds to compensate for installation of increased impervious surfaces (i.e. pavement, hangars, etc).

Based upon future development, seven stormwater treatment areas were identified designated as A-G as illustrated in **Figure 5-11**. As shown on **Figures 5-10** and **5-11**, proposed apron, hangar and taxilane were adjusted to accommodate the new treatment requirements. **Table 5-12** identifies anticipated project area, treatment volume and estimated costs associated with proposed development. However, prior to actual construction, survey, permitting and mitigation would be required.

Stormwater Treatment Area A – This area was originally designed to accommodate a 5,600 SY expansion of the South Apron in addition to construction of approximately 66 nested T-Hangars. The original design anticipated that the current drainage pond/lake could be expanded to provide treatment for the new T-Hangar facilities. However, as a result of the new treatment requirements, an expansion of the south apron was not possible and the south hangar development was adjusted to provide 54 T-Hangars and 6 box hangars thereby decreasing the total impervious service to 3.95 acres. Since wetland areas were identified east of the existing pond/lake on the area identified for future hangar development, additional treatment requirements were provided through the excess pond volume found in Stormwater Treatment Area D.

Stormwater Treatment Area B – As illustrated on **Figure 5-11,** Treatment Area B is related to the north airfield development. Initially, the proposed development included a 20,000 SF restaurant, automobile parking, seaplane hangar development, roadway relocation and 25,294 SY of Apron. Again, due to treatment requirements, the north apron area was decreased to approximately 19,770 SY. Recommended stormwater treatment could be provided between the north apron and Taxiway B as well as the north apron and the relocated access road (Wall Street). In addition, impervious surface would be further decreased with the removal of the existing commercial building and parking as shown on **Figure 5-11**. Thus, approximately 1.91 acres of additional stormwater treatment would be implemented.

Stormwater Treatment Area C – Alternative C includes the existing Port-A-Ports located south of the Sheriff's facilities on the west side of the airfield. Since these hangars are rather old, it was recommended that they be demolished and replaced with nested T-Hangars. In conjunction with the T-Hangar and taxilane development, which added approximately 0.30 acres of impervious surface, approximately 0.38 acres-feet of treatment volume would be required. The existing permitted pond is impacted by the proposed hangar; therefore, compensatory treatment volume is included in the required volumes illustrated in **Table 5-12**. Pond areas identified include the reconfigured pond in Stormwater Treatment Area C.

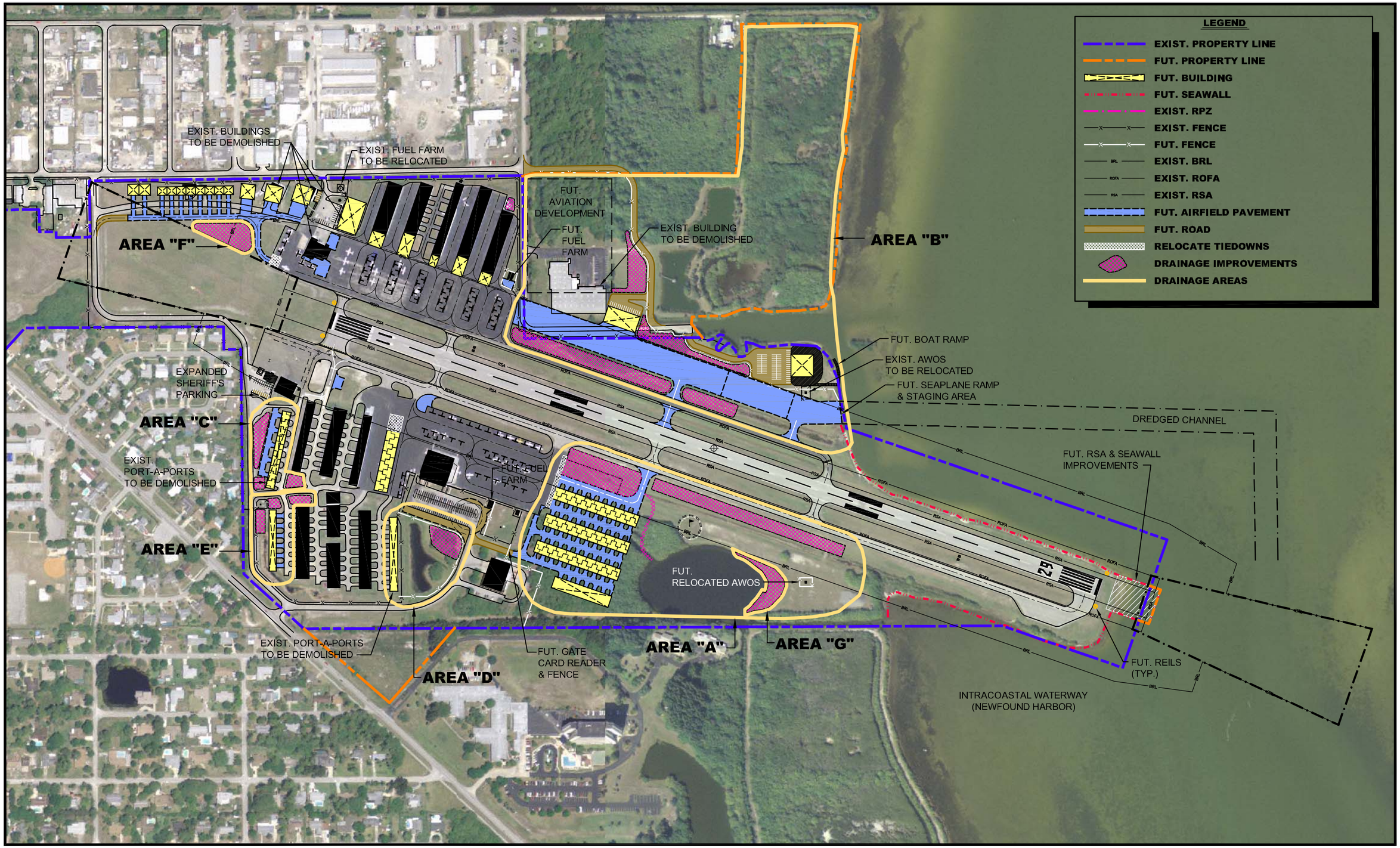
Stormwater Treatment Area D – Initially, the property south of the FBO parking lot, treatment area D, was designated for T-Hangar development. However, due to the potential impacts and costs of developing this area, it was determined that the ultimate and best use of the property would be for stormwater drainage and treatment. This part of the airfield already includes a treatment pond associated with hangar and apron development on the west side of the airfield. Therefore, it was determined that the pond

size could be increased to provide partial treatment and attenuation for the proposed south side hangar development. As a result, it was recommended that the Port-A-Ports south of the FBO be redeveloped as box rather than nested T-Hangars eliminating the need for additional taxilane construction.

Stormwater Treatment Area E – The existing permitted pond would be impacted by hangar and taxilane development. Therefore, proposed nested T-hangars were replaced by box hangars to limit additional pavement construction. This decreased new impervious surface to approximately 0.30 acres. In addition, airport utilities are currently located east of the entrance road. As a result, compensatory treatment volume was limited to the areas just north of the existing pond in Stormwater Treatment Area E, as well as east of the proposed and existing hangar development as illustrated in **Figures 5-10** and **11**. Therefore, in conjunction with proposed development, 0.143 ac-ft of treatment volume would be required.

Stormwater Treatment Area F – In conjunction with the northwest road relocation and hangar development, a stormwater treatment pond with an area of approximately 0.47 acres was recommended. This dry treatment pond is anticipated to provide approximately 0.38 acres-feet of treatment volume.

Stormwater Treatment Area G – As mentioned, the Authority is currently working with St. John's Water Management and FAA Airport District Office to allow the expansion of the existing drainage pond to allow for additional capacity related to proposed T-hangar and airfield improvements. Further, in conjunction with the proposed drainage, cut obtained from expanding the pond could be used to provide clean fill for the proposed south T-hangar development. Thus, in order to accommodate an additional .33 acres-ft of treatment volume, the pond would be expanded by approximately 0.40 acres. The proposed expansion in conjunction with other recommended drainage improvements will exceed the water treatment requirements associated with proposed long-term development.



LPA	Merritt Island Airport Master Plan Update	RECOMMENDED STORMWATER REQUIREMENTS	0' 200' 400' SCALE: 1" = 400'		DATE 04/28/2009 5-11 FIGURE NO.

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Table 5-12
Preliminary Stormwater Drainage Quantities

Stormwater Treatment Area	Project Area (AC)	New Impervious (AC)	Pond Area Required (AC) for 1' depth	Treatment Volume Required (AC-FT)	Pond Area Identified (AC)	Excavation Volume (CY)	Excavation Unit Price ($10.00/CY)	Structure and Pipe (LS)	Sod ($2.00/SY)	Preliminary Total
A	5.1	3.95	1.18	0.99	1.15	2284	$22,845	$18,000	$5,808	$46,653
B	10.21	6.00	1.89	1.58	1.91	3659	$36,590	$24,192	$11,093	$71,876
C	0.77	0.30	0.45	0.38	0.32	863	$8,630	$10,790	$1,859	$21,279
D	0.54	0.39	0.15	0.12	0.30	290	$2,904	$2,400	$1,742	$7,046
E	0.39	0.30	0.17	0.14	0.18	330	$3,305	$3,400	$1,035	$7,740
F	1.05	0.81	0.46	0.38	0.47	884	$8,840	$6,965	$2,247	$18,053
G	0.92	0.71	0.40	0.33	0.40	754	$7,540	$5,940	$1,916	$15,398

Notes: AC = Acreage
AC-FT = Acreage to Feet
CY = Cubic Yards
LS = Lump Sum
SY = Square Yards
Source: The LPA Group Incorporated, 2009

POTENTIAL ENVIRONMENTAL IMPACTS – PREFERRED ALTERNATIVE

Existing conditions within the airport were determined using available literature, geographic information systems (GIS) data, and aerial photographs. FAA Order 1050.1E, *Environmental Impacts and Procedures* provides guidelines in determining if an Airport project or action will require a categorical exclusion (CE), an environmental assessment (EA) or an environmental impact statement (EIS) level of documentation to satisfy requirements of the National Environmental Policy Act (NEPA). The following paragraphs describe the likely extent of NEPA documentation that would be required for each project. The ultimate decision regarding the necessary level of NEPA documentation for each project would be made by Airport District Office staff.

Projects that are Anticipated to be Categorically Excluded

The following projects are projects that are minor in scope and would be anticipated to require a CE level of NEPA documentation. FAA Order 1050.1E, Chapter 3, Section 310f states that construction of minor development, provided that there is no reasonable expectation of a change in use, should not cause environmental impacts. Some of these projects may have an environmental permitting component that would have to be addressed. In some cases, the projects are minor enough that they would likely be processed using a CE checklist rather than a narrative document format.

Categorical Exclusions with Low Environmental Permitting Involvement

The following projects are anticipated to have no or low natural resource related environmental impacts because the proposed location of the projects is within developed areas, which do not contain wetlands or suitable protected species habitat and therefore have no potential for protected species impacts:

- **T-Hangar Expansion on North Apron –** This project would be anticipated to have low or no environmental impacts because it will be located on the North Apron, which is already paved and developed. No environmental permitting is anticipated for this project.

- **Installation of Runway End Identifier Lights (REILs) –** The lighting would be installed immediately adjacent to the approach end of Runways 11 and 29 on uplands. No environmental impacts are anticipated. No environmental permitting is anticipated for this project.

- **AWOS Relocation –** The AWOS would be moved from its current location on the north side of the east end of Taxiway B to an area east of the stormwater pond on the south side of the airport and south of Taxiway A. To meet wind sensor clearance requirements, some mangrove trimming may be necessary east, southeast and south of the AWOS. This would require a mangrove trimming permit from FDEP.

- **Exit Taxiway Improvements (Taxiway A2 and Taxiway B3)** – This project is located within the developed portion of the interior of the airfield between Runway 11-29 and Taxiway A and between Runway 11-29 and Taxiway B. No environmental impacts are anticipated. Stormwater permitting may be required for the alteration of the existing surface water management system.

- **T-Hangar Development on South Apron –** This project would be anticipated to have low or no environmental impact because it will be located on the South Apron, which is already paved and developed. No environmental permitting is anticipated.

Categorical Exclusions with Moderate Environmental Permitting Involvement

The following projects have the potential for minimal or moderate environmental impacts. These projects may involve potential impacts to wetlands, surface waters, or other aspects of the human environment that must be taken into consideration during project planning and development. No suitable habitat for protected species occurs in the area of these projects; therefore, no protected species impacts are anticipated. Unavoidable impacts associated with these projects would be mitigated. Therefore it is anticipated that the impacts would not be considered to be significant.

- **Corporate/Conventional Hangar Development in Northwest Corner –** This project would involve the demolition of two buildings located northwest of the north apron that may be 50 years old or older. As such, these buildings should be evaluated by an architectural historian to determine whether they are eligible for listing on the National Register of Historic Places. The buildings would also have to be inspected to determine whether they contain hazardous materials (such as asbestos) prior to demolition. If such materials are present, they should be removed and disposed of properly prior to demolition according to state and federal regulations.

- **New Corporate Hangar on North Apron –** This project, located on the west end of the north apron, would also involve the demolition of a building that may be 50 years old or older. This building should be evaluated by an architectural historian to determine whether it is eligible for listing on the National Register of Historic Places. The building would also have to be inspected to determine whether it contains hazardous materials prior to demolition. If such materials are present, they should be removed and disposed of properly prior to demolition according to state and federal regulations.

- **Removal of Underground Storage Tanks (USTs) –** This project involves the removal of a 10,000 gallon Avgas underground storage tank

and the removal of a 10,000 gallon Jet A underground storage tank. The tanks must be removed according to state regulations, and the area surrounding the tanks would need to be tested for contamination. If contamination is found, remediation may be necessary.

- **New Fuel Farms on North and South Aprons –** This involves the construction of a new fuel farm at the east end of the north apron, as well as a new fuel farm adjacent to the FBO building on the south apron. Each fuel farm and its tanks would have to be designed/constructed to meet state and federal standards for fuel storage tanks. No change of use would result and no environmental impacts would be anticipated.

- **North Apron Expansion** – The north apron expansion project would involve an expansion of the north apron toward the east-southeast to connect to the proposed seaplane ramp and wash down area (discussed below). It is assumed that this project would occur some time after the proposed property acquisition described below has been completed. The project may involve wetland and surface water impacts and, therefore, may require environmental permitting. Mitigation may be required by the regulatory agencies for potential wetland and/or surface water impacts. The site of the proposed project is already converted to aviation/light industrial use; therefore no change of use would be associated with the project.

- **Seaplane Hangar Development** – This project would occur some time after the property acquisition and building demolition (described below) and after the north apron expansion (described above). The project may involve wetland and surface water impacts and associated environmental permitting. The project may also involve mangrove trimming/removal, which would require a permit. Mitigation may be required by the regulatory agencies for potential wetland and/or surface water impacts. The site of the proposed project is already converted to light industrial use; therefore no change of use would be associated with the project.

- **Restaurant and Boat Ramp Development** – This project would require the prior relocation of the AWOS. It would involve the construction of a restaurant, a parking area, and a dock north of the future seaplane ramp. The project may include wetland and/or surface water impacts and permitting, benthic survey and a dock permit, mangrove trimming and permitting, and potentially a waiver of the Brevard County 50 foot construction setback requirements. The restaurant would be constructed on an area that appears to be old fill material (based on historical aerial photography) that has been in place since the construction of the airport in the 1950s.

- **Development of Four New T-Hangar Buildings** – This project would involve the construction of four new t-hangar buildings between the south apron and the large stormwater pond on the south side of Taxiway A and an associated expansion of the south apron. The project may include wetland and surface water impacts and associated environmental permitting. Mitigation may be required by the regulatory agencies for potential wetland and/or surface water impacts.

- **T-Hangar Development in Southwest Corner –** This project would involve the demolition of existing port-a-ports on the west and southeast portion of the existing T-hangar complex associated with the south apron, and the construction of a total of five new T-hangar buildings, two in the west portion of the existing south apron T-hangar complex and three in the east portion of the complex. The construction of one of the three buildings in the east portion would require the filling of an existing man made stormwater pond. The large pond east of the south apron would have to be expanded to compensate for this. This project would require permitting for potential surface water and wetland impacts. Mitigation may be required by the regulatory agencies for potential wetland and/or surface water impacts.

Projects that are Anticipated to Require an Environmental Assessment Level of Documentation

The following projects would be anticipated to require an EA, either because they are listed as a type of project normally requiring an EA, according to FAA Order 1050.1E, or because the level of potential environmental impact involved with the project would potentially require a U.S. Army Corps of Engineers (COE) individual permit that could elevate the documentation requirements to an EA level of documentation.

- **RSA Improvements, Seawall Improvements, and Seaplane Ramp and Wash Down Area –** This project would involve expansion of the RSA at the approach end of Runway 29 to meet current FAA standards, the reconstruction/rehabilitation of the seawall around the east end of the airport's property, and the construction of a new seaplane ramp parallel to, and just north of, the east end of Taxiway B. The project may involve environmental impacts to the following natural resource categories:

  1. Federal and state jurisdictional wetlands;
  2. Other Waters of the U.S./Surface waters of the state;
  3. Seagrasses;
  4. Protected species (manatee);
  5. Mangroves;
  6. Essential fish habitat; and,
  7. Aquatic preserve impacts (Banana River).

Types of environmental permitting and/or coordination that may be required would include the following:

1. Environmental Resource Permit (ERP) for federal and state jurisdictional wetlands and/or surface waters impacts, seagrass impacts, mangrove trimming and/or removal, and sovereign submerged lands lease/acquisition;
2. Coordination with the U.S. Fish and Wildlife Service; National Oceanic and Atmospheric Administration, Marine Fisheries Service (NOAA Fisheries); and Florida Fish and Wildlife Conservation Commission (FFWCC) for potential protected species impacts;
3. Coordination with NOAA Fisheries for Essential Fish Habitat impacts.

- **Future Property Acquisition, Road Relocation, and Aviation Development Area (includes building demolition) –** Based on Order 1050.1E, property acquisition of more than three acres for, and the construction of, FAA buildings/facilities normally requires an EA. This project would involve the acquisition of six parcels, totaling 28.36 acres, located east of Kemp Street and between Wall Street and Cone Road. The project would include the extension of Manor Drive/relocation of Wall Street and acquisition and demolition of an existing building that houses Autocraft Manufacturing, a light auto parts manufacturing business. The project may involve environmental permitting for wetlands impact due to the road relocation. The building proposed for demolition would also need to be inspected for hazardous materials, and if such materials were found, they would need to be disposed of according to state and federal regulations prior to demolition of the building.

Regulatory / Permitting

FAA Regulatory Requirements – FAA Order 1050.1E, Chapter 3, Section 304c states that an action affecting U.S. waters including jurisdictional wetland that does not qualify for a general permit would require an EA. Therefore, projects listed above as potentially qualifying for a CE may have to be elevated to EA status depending on the level of wetland permitting involved. This would not be able to be determined until a jurisdictional determination has been performed for each area and proposed wetland impacts are quantified based on each project's design. The same section states that any action that may affect listed or candidate species under the Endangered Species Act, including designated or proposed critical habitats will require an EA level of documentation.

Federal and State Wetlands Permits – Any project that proposes impact to existing federal jurisdictional wetlands or other waters of the U.S. requires a Corps of Engineers

(COE) Dredge and Fill permit. Projects impacting state jurisdictional surface waters and wetlands or alterations to existing surface water management systems require a permit from the St. Johns River Water Management District (SJRWMD) or the Florida Department of Environmental Protection (FDEP). These permitting processes are handled through the state's ERP program. The ERP application is a joint application for both the state and federal permits.

Listed Species Impact Permits – Projects that have the potential to impact or propose impact to federally protected species and their habitats require coordination and/or consultation with the USFWS and/or NOAA Fisheries. Similarly, proposed or potential impacts to state protected species and their habitats require coordination with the FFWCC.

Essential Fish Habitat – Projects that propose impacts to marine habitats require coordination with NOAA Fisheries. Based on the results of this coordination, a determination would be made as to whether impacts to Essential Fish Habitat would result from the project. If it is determined that the project would impact essential fish habitat, NOAA fisheries would make recommendations to conserve the habitat and reduce the impacts of the project. The COE, SJRWMD, or FDEP would then likely require that those recommendations be implemented as a condition of the issuance of the ERP permit.

Florida Department of Environmental Protection

National Pollution Discharge Elimination System – All proposed projects that involve the construction of new stormwater management systems and/or alteration of existing stormwater management system require a National Pollution Discharge Elimination System (NDPES) permit for stormwater discharge into water resources of the United States from the FDEP. Additionally, land disturbing activities of greater than 0.5 acre require an NPDES permit for construction activities.

Mangroves
Mangroves are protected by the states 1996 Mangrove Trimming and Preservation Act. FDEP is the permitting agency for mangrove trimming and removal. If mangrove trimming is proposed for a project that also requires an ERP from FDEP, the mangrove trimming authorization will be issued as part of the ERP permit.

Hazardous Materials
40 Code of Federal Regulations (CFR) Part 61, Subpart M established the National Emissions Standards for Hazardous Air Pollutants, including asbestos. Asbestos removal and remediation during building demolition and renovation is regulated by FDEP in the State of Florida under Chapters 62-257 Florida Administrative Code (FAC).

Under Chapter 62-761, the FDEP regulates the removal and installation of underground storage tanks. FDEP sets standards for installation of new tanks, is responsible for performing annual compliance inspections, and enforcing petroleum cleanup requirements. The U.S. Environmental Protection Agency regulations on underground storage tanks are found in 40 CFR Parts 281, 282.50 and 282.52.

Order of Magnitude Cost Estimates

Order of magnitude costs for the Preferred Development Concept are shown in **Table 5-13** below. Note that the costs do not include mitigation for potential wetland or other environmental impacts unless indicated. If these projects are implemented at COI, funding could be expected from various public and private sources (e.g., FAA, FDOT, TICO Authority, or private business).

Table 5-13
Order of Magnitude Costs
Preferred Development Concept

Project	Estimated Cost
Short-Term Development	
Access Road & Parking Lot Resurfacing project	$150,000
2008 Airport Master Plan Update	$165,770
RSA and Seawall Improvement Environmental Assessment & Wetland Permitting	$275,000
RSA and Seawall Design (Structural and Aviation)	$280,000
CA, RPR and QCX Testing	$180,000
CCTV & New Access Control System	$200,000
Northwest Roadway Relocation	$480,000
Dual Card Security Gate - Northwest Hangar Development	$50,000
Stormwater Drainage Area F	$20,000
Land Acquisition - Parcel D	$215,000
Environmental Mitigation (Seagrass Mitigation)	$600,000
RSA Property Easement Acquisition	$4,000
Sherriff's Apron Marking and hold bars	$1,500
Taxiway Marking Removal adjacent to Sheriff's Hangar	$2,600
Construct 11-unit T-Hangar on south apron (on former tie-downs)	$1,410,000
Airport Security Enhancements	$350,000
Dual Card Security Gate - Fuel Farm Northside	$50,000
Land Acquisition (Runway 29)	$900,000
RSA and Seawall Construction	$1,800,000
Construct Run-up pad adjacent to Taxiway A-1	$213,000
Expand County Clearzone Easement to encompass entire RPZ	$30,000
Rehabilitate South Apron Pavement	$1,160,000
Sheriff's Signage Improvement (lighted signage)	$13,000
Relocate Fenceline	$35,000
RSA and Seawall Construction	$1,800,000
Fuel Farm Removal - Underground Tanks	$360,000
New Stormwater Pond - North of T-Hangar 5	$21,000
Fuel Tank Install - two 10,000-Gallon Tank (North Apron)	$616,400
Fuel Farm Concrete Slap - North Side	$159,000
Short-Term Development	**$11,541,270**
Mid-Term Development	
Expand Auto Parking Adjacent to Sheriff's Hangar and Civil Air Patrol	$80,000
Relocate Fenceline	$1,160,000
RSA and Seawall Construction	$1,800,000
Construct Seaplane Ramp	$240,000
Mosquito Control Demolition (Hazmat Permitting)	$83,000
50 x 50 Box Hangar	$600,000
Asphalt Drive to Box Hangar - (50 x 50 Hgr)	$23,000
Alternative B Drainage - North Apron Development	$72,000
Rehabilitate Taxiway B	$575,000
New Fenceline North Apron and Sea Plane Ramp	$220,000
Fenceline Removal North Apron/Sea Plane Ramp	$4,000
Runway End Identifier Lights (Both Runway Ends)	$4,000
2 38 x 42 Box Hangars	$760,000
Asphalt Drives to Box Hangars (38 x 42)	$45,000
Construct Seaplane Wash Down Area	$360,000
Install New AWOS	$206,000

Table 5-13
Order of Magnitude Costs
Preferred Development Concept

Expand Existing Drainage Pond (Drainage Area G)	$16,000
North Apron Phase I with Taxiway	$650,000
Rehabilitate Runway 11-29, including markings	$1,300,000
Demolish Port-A-Ports (south of Sheriff's Hangar)	$200,000
Relocate Fence south of Sheriff's Hangar	$90,000
Voyager Aviation International Demolition	$109,000
2 38 x 42 Box Hangars	$760,000
Asphalt Drives to Box Hangars (38 x 42)	$45,000
Rehabilitate Runway 11-29, including markings	$1,200,000
90 x 150 Corporate Hangar (New Voyager Building)	$3,200,000
Airport Master Plan Update - 2016	$150,000
Dual Card Security Gate - South T-Hangar Development	$50,000
Alternative A Drainage - South T-Hangar Development	$50,000
Construct Taxilane west of fenceline	$200,000
Alternative C Drainage - Proposed T-Hangars south of Sheriff's Facilities	$20,000
Total Mid-Term Development	**$14,272,000**
Long-Term Development	
Construct 10-Unit T-Hangar (south of sheriff's Hangar)	$1,300,000
50 x 50 Box Hangar	$600,000
Asphalt Drive (50 x 50)	$25,000
Taxilanes adjacent to 18-Unit T-Hangar	$400,000
2 38 x 42 Box Hangars	$760,000
Asphalt Drives to Box Hangars (38 x 42)	$50,000
Rehabilitate Taxiway A	$1,000,000
Rehabilitate North Apron Pavement	$700,000
Construct South Side T-Hangar Development (18-Unit) - Phase I	$2,500,000
Taxilanes adjacent to 18-Unit T-Hangar	$500,000
Expand Electrical Vault and Upgrade Taxiway Lighting (LED)	$1,020,000
Land Acquisition (Runway 11 Approach)	$600,000
Install pavement fillet (South Apron and Taxiway A-2 Capacity Improvement)	$10,500
North Property Acquisition	$7,000,000
Rehabilitate North Apron Pavement - Phase II	$700,000
80 x 80 Corporate Hangar	$1,500,000
Corporate Hangar Asphalt Drive	$60,000
Fenceline Removal Associated with street relocation	$6,000
Permitting	$5,000
2 38 x 42 Box Hangars	$760,000
Asphalt Drive to Box Hangar - (38 x 42)	$50,000
Expand South Apron	$500,000
Construct South Side T-Hangar Development (18-Unit) - Phase II	$2,400,000
Sebastian Communications Demolition	$300,000
Phase II North Apron Construction and Taxiway Connector	$1,000,000
Construct 6-Box Hangars south of T-hangar development (west side of airport)	$3,500,000
65 x 65 Corporate Hangar	$1,005,550
Construct Asphalt Drive	$50,000
Expand North Apron adjacent to Voyager	$544,000
Relocate Wall Street and Kemp Street	$529,085
New Fenceline along relocated Wall and Kemp Street	$348,800

Table 5-13
Order of Magnitude Costs
Preferred Development Concept

Alternative E Drainage - Proposed Box Hangars South of Sheriff's Facilities	$9,247
Demolish Port-A-Ports (southwest of Spacecoast Aviation Facilities)	$236,574
Construct 8 Box Hangars on former Port-A-Port Location	$2,796,175
Taxilanes adjacent to 18 unit T-Hangars - Phase III	$1,916,193
Expand FBO parking lot	$278,350
Relocate Fenceline south of Parking Lot	$78,591
Construct South Side T-Hangar Development (18-Units) - Phase III	$2,303,374
Construct Parking Facilities and Entrance Road	$186,736
Construct Restaurant Parking and Access Road to Wall Street Road	$1,406,250
Relocate Fenceline associated with Restaurant Development	$981,000
Alternative D Drainage - Port-a-Ports south of FBO Parking	$7,046
Concrete Roundabout for Fuel Farm Delivery	$73,250
Fuel Farm Install - Two 10,000-Gallon Tanks (Space Coast)	$616,400
Construct two-story Restaurant (75 x 150)	$10,935,000
Permitting for Boat Dock	$5,000
Airport Master Plan Update - 2026	$150,000
Dual Card Security Gate - Fuel Farm Southside	$47,250
Construct boat dock	$120,000
75 x 150 Seaplane Hangar (Top Flight)	$2,677,500
North Apron Expansion - Phase III	$3,200,000
Construct Connector Taxiway (Taxiway B and Runway 29)	$39,900
Top Flight Services Demolition (Hazmat Permitting)	$141,900
Rehabilitation of Airport Facilities	$1,100,000
Construct South Side Box Hangar Development (6 units) - Phase III	$2,118,200
Drives related to Box Hangars - Phase III	$51,600
Expand T-Hangars On North Side (13 Bays)	$1,663,548
Total Long-Term Development	**$62,863,019**
Preferred Alternative Order of Magnitude Costs	**$88,676,289**

Source: The LPA Group Incorporated, 2008

Summary

The process utilized in assessing airside and landside development alternatives involved an analysis of long-term requirements and growth potential. Current airport design standards were reflected in the analysis of runway and taxiway needs, with consideration given to the safety areas required by the FAA in runway approaches. As design standards are further modified in the future, revisions may need to be made in the plan, which could affect future development options.

As any good long-range planning tool, the final master-planning concept should remain flexible to unique opportunities that may be presented to the airport. It should also be kept in mind that changes in market conditions such as aircraft operations may dictate the acceleration or delay of projects.

The preferred alternative will be further refined in the development of Merritt Island Airport's Layout Plan (ALP). In addition, cost estimates, phasing, and funding options

for the projects identified in the preferred alternative are further refined and illustrated in the Implementation Chapter of this Master Plan report.