5 FACILITY REQUIREMENTS

5.1 INTRODUCTION

To ensure that Southwest Florida International Airport will be able to adequately accommodate the various demands that are expected during the 20-year planning period, this chapter will establish the general facility requirements for the future development of the airport. One of the principle challenges facing any airport is development. Airport development can be particularly costly and since each project is typically planned to last many years, care must be taken to ensure that each development project will help satisfy the airport's needs and enhance the capability and quality of the airport. Analyzing future requirements of an airport with respect to safety standards, capacity shortfalls and the demand for services provides a guide for the operational, airfield, building, infrastructure and land requirements that must be addressed to meet demand. Once these requirements have been identified, different development alternatives can be created and analyzed to address each facility need. Assessment of relative benefits or disadvantages of each development option can then be undertaken in such a way to ensure that the greatest benefits are provided to the users, tenants, local community, and of course, to the airport itself.

The objective of this section is to identify, in general terms, the adequacy or inadequacy of the existing airport facilities and outline what new facilities may be needed based on the level or threshold of activity that generates the need for expansion. Having established these facility requirements, alternatives for providing these facilities will be developed and then assessed to determine the most cost-effective and efficient means for meeting these requirements. It is important to note that an airport must be developed in the context of air safety. Improvements to the airport must allow for continued safe operation of aircraft into and out of the airport as well as maneuvering on the ground. Accommodating these capabilities safely is the most basic function of an airport facility and, as such, the needs associated with these capabilities are addressed first.

5.2 AIRPORT ROLE AND SERVICE LEVEL

The FAA, through the National Plan of Integrated Airport System (NPIAS), establishes the role and service level of each airport included within that plan. The role for each airport identifies one of five basic service levels, which describe the type of public service the airport is expected to provide to the community. The role and service level also represents the funding categories set by Congress to assist in airport development. Southwest Florida International Airport is designated as a public use commercial service-primary airport according to 1998-2002 NPIAS transmitted to Congress in March 1999. Commercial service airports are defined as public airports receiving scheduled passenger service and having 2,500 or more enplaned passengers per year. There are 540 commercial service airports throughout the United States. Of these, 413 have more than 10,000 enplanements and are classified as primary airports. According to the 1998-2002 NPIAS, primary airports such as RSW receive an annual apportionment of at least $500,000 in Airport Improvement Program (AIP) funds, with a total amount determined by the number of enplaned passengers.

5.3 AIRPORT REFERENCE CODE AND CRITICAL AIRCRAFT

An initial step in identifying an airport's future requirements is the establishment of fundamental development guidelines. By examining the types of aircraft expected to use the airport, it is possible to establish the critical aircraft for design purposes. This critical aircraft is usually the most demanding aircraft using the airport. The FAA defines this as the largest, heaviest, and fastest aircraft forecast to have more than 500 annual itinerant operations at the airfield.

After the critical aircraft has been determined, an Airport Reference Code (ARC) is established based on the characteristics of that aircraft. The two primary characteristics of a critical aircraft are the aircraft's wingspan and approach speed. Because some aircraft may have large wingspans and relatively slow approach speeds, while others may have high approach speeds with shorter wingspans, it is sometimes necessary to establish more than one critical aircraft. Additionally, it may be necessary in some instances to design certain areas to a higher design standard than the rest of the airport in order to accommodate certain operations.

The ARC is made up of two components, a letter designation followed by a Roman numeral. The letter indicates the approach category (approach speed) of the most demanding aircraft, while the Roman numeral designates the Design Group (wingspan) of the most demanding aircraft. **Table 5-1** and **Table 5-2** delineate the Aircraft Approach Categories and Aircraft Design Groups according to FAA Advisory Circular (AC) 150/5300-13, Change 6, "Airport Design."

TABLE 5-1
AIRCRAFT APPROACH CATEGORIES

Category	Approach Speed (knots)
A	< 91
B	91 – 121
C	121 – 141
D	141 – 166
E	> 166

Source: FAA AC 150/5300-13 Change 7.

TABLE 5-2
AIRCRAFT DESIGN GROUPS

Design Group	Wingspan (feet)
I	< 49
II	50 – 79
III	80 – 118
IV	119 – 171
V	172 – 214
VI	215 – 262

Source: FAA AC 150/5300-13 Change 7.

As determined in the 1992 Airport Master Plan conducted by Coffman & Associates, the Airport was designed to ARC D-V standards. This was due to the expected operations of larger aircraft such as the Boeing 747. Based on previous analyses at RSW and the expectation that large aircraft such as the B747, A330, and A340 will provide service to the Airport in the future, it is recommended the ARC remain a D-V.

The future airport facility layout will be undertaken in accordance with FAA design criteria established in Advisory Circular 150/5300-13 Airport Design, Change 6. The specific design criteria associated with Airport Reference Code D-V are shown in **Table 5-3**.

TABLE 5-3
AIRPORT DESIGN – AIRPLANE AND AIRPORT DATA

Criteria	ADG D-V (Ft.)
Runway to Parallel Taxiway/Taxilane Centerline	400
Runway Centerline to aircraft parking area	500
Runway Width	150
Runway Shoulder Width	35
Runway Blast Pad Width	220
Runway Blast Pad Length	400
Runway Safety Area Width	500
Runway Safety Area Length Beyond each Runway End	1,000
Runway Object Free Area (ROFA) Width	800
ROFA Length Beyond Each Runway End	1,000
Runway Obstacle Free Zone (OFZ) Width	400
Runway OFZ Length Beyond Runway End	200
Taxiway Centerline to Parallel Taxiway/Lane Centerline	267
Taxiway Centerline to Fixed or Movable Object	160
Taxilane Centerline to Parallel Taxiway/Lane Centerline	245
Taxilane Centerline to Fixed or Movable Object	138
Taxiway Width	75
Taxiway Shoulder Width	35
Taxiway Safety Area Width	214
Taxiway Object Free Area Width	320
Taxilane Object Free Area Width	276
Taxiway Edge Safety Margin	15
Taxiway Wingtip Clearance	53
Taxilane Wingtip Clearance	31

Source: Airport Design AC 150/5300-13 Change 7.

5.4 AIRFIELD REQUIREMENTS

5.4.1 Airfield Capacity

The Airport's ASV as outlined in Chapter Four is currently estimated at 150,040 annual operations. Over the planning period, the ASV at RSW will decline slightly as the fleet mix shifts to a slightly higher percentage of Class D aircraft. As such, the ASV is projected to decrease to 136,400 annual operations or more than 100 percent of capacity by the Year 2020. This indicates the need for airfield improvements within the 20-year planning period.

RSW is projected to reach over 60 percent of capacity by 2005, almost 80 percent of capacity by 2010, and exceed 100 percent by 2020. Due to the extreme peaking characteristics at the Airport, and the current airfield configuration, the addition of a new runway would be the only improvement capable of providing the increase in capacity required to accommodate the projected demand. A parallel runway typically provides the greatest increase in capacity. However, this configuration can only be beneficial if wind conditions at the airport are compatible. Wind conditions at RSW are ideal to provide for such a configuration with Runway 6-24 accounting for over 98 percent wind coverage. Based on this, it is recommended that a new runway parallel to the existing Runway 6-24 be considered in providing the required capacity improvement at RSW.

5.4.2 Runway Requirements

This section addresses the specific requirements relative to Runway 6-24 as well as the new parallel runway. As a primary airfield facility at any airport, a runway must have the proper width, length, and strength to safely accommodate the critical aircraft expected to use the airfield.

Runway width requirements for airport design are included in FAA AC 150/5300-13, Change 6. The design standards are based on the critical aircraft's Approach Category, Design Group, and the approach visibility minimums at the Airport.

FAA AC 150/5325-4A, "Runway Length Requirements for Airport Design" and the FAA “Airport Design” software, Version 4.2D, provide guidelines to determine the ultimate runway length required at an airport facility. These guidelines consider airfield conditions such as the elevation, mean daily maximum temperature, and effective runway gradient. Length determinations also consider critical aircraft data such as takeoff weight, length of haul and payload using individual aircraft performance manuals published by the manufacturers.

The runway’s pavement strength is also an important factor to consider in the future runway requirements. Airport pavement strength is evaluated to establish load carrying capacity for expected operations, to assess the ability of pavements to support significant changes from expected volumes or types of traffic, and to determine the condition of existing pavements for use in the planning or design of improvements which may be required to upgrade a facility.

Runway 6-24

Runway Width

The current width for Runway 6-24 is 150 feet. Criteria contained in FAA AC 150/5300-13, Change 7, states that for the D-V designation, a runway width of 150 feet is adequate. However, if the runway at RSW is utilized by New Large Aircraft (NLA) in the future, the runway width will need to be upgraded to standards pertaining to FAA design group E-VI. These standards are discussed later in this chapter.

Runway Length Analysis

A runway length analysis for Runway 6-24 was conducted in the Runway Extension Justification Study completed in 1989 by Coffman & Associates. As a result of larger aircraft operational demands, it was determined that a runway extension from 8,400 feet to 12,000 feet was required. This was adopted into the 1992 Airport Master Plan (Coffman Study). As a result, the extension of the runway to 12,000 feet was completed in 1994.

As determined from the aforementioned 1989 Runway Extension Justification Study, the 12,000-foot runway is capable of handling long-range activity by large aircraft including the Boeing 747-400. When comparing the stage lengths of the aircraft used in the Runway Extension Justification Study to the current aircraft using the airport, it was determined that the existing 12,000 foot runway is capable of handling all the types of aircraft using RSW today. This includes the newer short-haul jets and larger Airbus models such as the A330 and A340. As determined by the Coffman & Associates Study a stage length of approximately 2,500 nautical miles was calculated as being sufficient to reach all domestic markets. Based on this, the existing runway is more than sufficient in length to handle all current and projected domestic aircraft operations into and out of RSW. When compared to the initial runway length analysis, the current international route stage lengths have not changed significantly and still remain between 5,000 and 6,500 nautical miles. As such, no improvements are recommended with regard to the Runway 6-24 length.

Runway Pavement Strength

As indicated in the Inventory Chapter, the Runway 6-24 pavement is currently strength rated at 30,000 pounds single wheel loading (SWL); 190,000 pounds dual wheel loading (DWL); 430,000 pounds dual-tandem loading, and 840,000 pounds double-dual-tandem loading (DDTL). The 840,000-pound double-dual tandem strength rating satisfies the demands of the heaviest double dual tandem aircraft, the Boeing 747-400, that would serve RSW. As such, the pavement strength of Runway 6-24 is considered to be adequate throughout the planning period for all aircraft currently serving or projected to serve RSW. However, if NLA aircraft demand is identified during this period, pavement strength will need to be revisited to ensure that such operations will not require additional pavement improvements. This is addressed further later in this chapter.

Runway Condition

The existing runway is generally noted in fair condition. However, as indicated in the Inventory Chapter, the PCI indices depict certain areas of the 18-year old runway as being in very poor condition. With the rate of deterioration increasing as the pavement ages, a full rehabilitation of the runway is recommended in the near term. Various approaches to accomplishing this will be addressed in the Alternatives chapter of this Master Plan.

New Runway

The additional capacity provided by a new runway is not necessarily proportional to the number of runways, but is dependent on a number of factors that impact the use of each runway in the system. These include:

- Number of existing runways.
- Aircraft use restrictions associated with the use of the runway.
- Runway orientation/configuration.
- Runway length.
- Runway width.
- Runway strength.

A runway's utilization is determined in part by its length, strength, instrumentation, and separation from and orientation to the other runways at the airport. For example, adding a shorter commuter-length runway will limit its utility since larger aircraft will not be able to use it. Similarly, new runways oriented in a parallel manner to an existing runway system generally provide greater utility since aircraft approaches will not intersect with approaches to other runways.

Runway spacing is also a major factor in determining runway system capacity as it affects the dependency of runway operations, meaning that inadequate spacing between two parallel runways dictates that the use of one runway is dependent or constrained by activity on the other. The following sections outline key factors in developing a new runway to serve RSW.

Orientation/Configuration

The idea of a parallel runway at RSW has been present since the original plans for the Airport proposed in the 1970s. As previously mentioned, wind conditions are ideally suited to provide for such a configuration with 98.06 percent wind coverage for the 6-24 orientation. Thus, a parallel runway would be the optimal choice for a new runway. The original airport plan provided for a general aviation only parallel runway located north of the existing runway. Updated activity projections along with change in aircraft fleet mix projections set forth in the 1992 Master Plan conducted by Coffman & Associates, proposed a longer south parallel runway to accommodate air carrier aircraft and provide for simultaneous instrument approaches. This configuration would allow RSW to maximize its long-range flexibility in serving the growing demand for air service in the Southwest Florida Region. The previous master plan concluded that a parallel runway of the same length as the existing runway should be planned for, with a 5,875-foot spacing from the existing runway. This spacing was to allow the maximum possible development area for a midfield terminal without impacting the major inland slough to the south.

In 1993, the Coffman Parallel Runway Length and Separation Refinement Study reviewed the proposed new parallel runway's length and spacing to determine if development costs could be reduced. Based on this review, the Refinement Study suggested a reduction in spacing to 5,385 feet from the 5,875-foot spacing originally proposed. By doing so, it was determined that the double (now triple) row of 230 Kv power lines to the south would not require relocation along the length of the runway, only where they passed beyond the new runway's northern end. The 5,385-foot spacing provided 1,095 feet of horizontal clearance from the 88-foot MSL power line poles, plus an additional six-foot clearance margin of safety. According to the 1994 Environmental Assessment, the reduced parallel runway spacing would reduce the length of power lines requiring relocation from approximately 19,000 feet to approximately 4,500 feet.

It is important to note that from an operational standpoint, as stated in the Coffman Parallel Runway Length and Separation Refinement Study, the installation of an Instrument Landing System (ILS) on either end of the parallel runway would not be possible. According to the report and the FAA, the power lines would severely distort the localizer signals, rendering the ILS approach unusable. This is a potential disadvantage considering the ultimate plan to have simultaneous precision instrument approaches. However, with the advent of Global Position System (GPS) technology, an ILS may not be needed. The use of GPS for precision approaches at RSW is discussed further in the Navaid Section of this chapter.

In conclusion, the proposed refinement as stated in the Parallel Runway Length and Separation Refinement Study reduced the runway separation from the original 5,875 feet to 5,385 feet. This new distance is 1,085 feet more than the FAA's minimum recommended separation of 4,300 feet required for simultaneous instrument approaches and provides considerable room to construct the Midfield Terminal Complex without conflicting with airspace requirements for a precision approach runway. Based on this, it is recommended that the revised configuration be maintained as the preferred configuration for the new runway. Future analysis should continue to consider the rate of passenger growth and whether adequate terminal area expansion can be accommodated within the midfield expansion envelop without an additional shift of the runway's location to the south.

Runway Width

As the new runway will be planned to accommodate simultaneous precision instrument approaches and the same commercial aircraft serving the current runway, the width of the new runway should adhere to Aircraft Design Group D-V as stipulated in FAA AC 150/5300-13, Change 6, which states that for D-V designations, a runway width of 150 feet is adequate. However, standards for New Large Aircraft (NLA) will have to be considered as the potential for such operations in the future exists.

Runway Length

The 1992 master plan noted that a shorter parallel runway length could meet most air carrier needs, but that a 12,000-foot length would ensure maximum flexibility for serving international flights. The primary advantages associated with having two 12,000 foot runways includes the capability to use either runway for all types of aircraft operations, thus providing the air traffic controller with the maximum flexibility, efficiency, and safety for assigning aircraft to runways. This would be especially advantageous in the Fort Myers area since air traffic has been increasing steadily for all the airports in close proximity.

In the Parallel Runway Length and Separation Refinement Study conducted by Coffman Associates in 1993, the minimum length requirements were again addressed. It was determined that existing and projected international traffic levels did not likely warrant a full 12,000-foot runway in the near term. As such, runway length reductions that could reduce initial cost without impacting operational capabilities were explored.

It was noted that there were three sets of power lines beyond the northeastern end of the proposed parallel runway. The poles of the line closest to the proposed parallel runway, carrying 230 kv, are 73 feet above ground level (AGL) or 104 feet above mean sea level (MSL). The second power line, another 230 kv line, is slightly further away and has a maximum elevation of 119 feet MSL. The third line, carrying 500 kv, has a maximum elevation of 144 feet MSL and is therefore the controlling approach surface obstruction in the area of the proposed parallel runway. As calculated in the Refinement Study, the elevation difference between the runway threshold elevation and the 500 kv power line is 112 feet. It was determined that the threshold location for a 9,100-foot parallel runway would provide at least 20 feet of clearance from the top of the power lines to the 50 to 1 slope precision approach surface.

Based on a review of current and projected activity, it is anticipated that a length of 9,100 feet would provide the necessary capacity and capability to accommodate over 90 percent of projected aircraft departures through the Year 2020. Therefore, 9,100 feet is recommended as the minimum runway length to satisfy demand throughout the planning period.

Runway Strength

The strength of the existing runway at RSW is designed to accommodate aircraft as large as the Boeing 747-400 with an ADG D-V. As this designation represents the most critical aircraft expected to use the facilities, it is recommended that the new runway be designed to the same D-V standards. Even if the new runway will not be utilized by such large aircraft in the short-term period, the construction of a D-V pavement strength will ensure future compliance with larger aircraft demand and possible extension of the runway if required in the future. Again, with the potential for NLA activity at the Airport, pavement consideration should be addressed during the preliminary design phase.

5.4.3 Taxiway System Requirements

A proper taxiway system should provide freedom of movement to and from the runways of an airport under a variety of operating conditions. This includes entrance and exit taxiways, taxiway run-up areas, apron taxiways, and taxilanes. Some of the basic design principles for an efficient taxiway system include the following:

- Provide each active runway with a full parallel taxiway.
- Construct as many by-pass, multiple access, or connector taxiways as required to ensure efficient access to each runway and runway end.
- Provide taxiway hold areas for each runway end.
- Build all taxiway routes as direct as possible.
- Provide adequate curve and fillet radii.
- Avoid developing areas which might create ground traffic congestion.
- Ensure taxiways are adequate to serve projected aircraft ARC.

Improvements to a taxiway system can be warranted for more than just capacity enhancement reasons. A key consideration for taxiway enhancements is the safety of aircraft movements, as well as the efficiency of aircraft movements on the airfield and to access developing portions of the airport. The following sections outline requirements needed for the existing taxiway system at RSW.

Taxiway 'A'

Taxiway 'A' is the full-length parallel taxiway serving Runway 6-24. This taxiway, which is located on the north side of Runway 6-24, has been constructed to a width of 75 feet, and meets the design Group V's minimum taxiway width. Taxiway A's runway centerline to taxiway centerline spacing of 400 feet also meets the separation standards for Design Group V aircraft. The parallel taxiway has a total of nine taxiway connectors, all of which provide access to and from the parallel taxiway and the runway. Five of these taxiways, Taxiways A-4 through A-8, are high-speed exit taxiways. As noted in the Inventory Chapter, the full-length taxiway is in good overall condition. Several areas have been treated for cracking, but currently have no significant impacts on operations. However, Taxiway A-8 was observed to have severe cracking and a sealant has been applied as a temporary solution until the area can be resurfaced. With the current condition and age of Taxiway A and its associated connectors, it is recommended that resurfacing treatment be conducted in the short-term to intermediate period.

Taxilane 'B'

As noted in the Inventory Chapter, Taxilane B is the 1,580 foot long apron taxilane that runs parallel to the Passenger Terminal. It serves as the terminal apron area taxilane for aircraft transitioning to and from the gate positions and to and from taxiways A-6, A-7, and A-8. The separation distance from the Taxilane centerline to the parallel taxiway centerline is 435.5 feet. This separation distance exceeds the FAA minimum of 267 feet for ADG V type aircraft. Taxilane B is in good condition, but should be considered for resurfacing following the relocation of the terminal. The priority for the project will also depend on the ultimate reuse strategy for the existing terminal.

Runway 6-24 South Parallel Taxiways

To provide adequate access between the Midfield Terminal Complex and the existing Runway 6-24, a two-phase dual parallel taxiway system will be required. These taxiways are crucial to the efficient operation of aircraft taxiing to and from Runway 6-24. The nearest taxiway to the runway should be planned with the same FAA separation standards and taxiway width standards as the current parallel ADG V taxiway. Per interviews with Air Traffic Control (ATC), it is recommended this taxiway be planned to include a hold-bay/by-pass area to facilitate traffic movement efficiency and allow for improved sequencing of aircraft. The second parallel taxiway, developed as a later phase improvement, should be designed to New Large Aircraft (NLA) standards. The NLA standards demand an increase in the separation and taxiway width standards and are outlined later in this chapter.

New Runway North Parallel Taxiway

In reviewing projected demand and the configuration of the ultimate midfield program, it is recommended that the new runway be configured with a single parallel taxiway. It is recommended that the taxiway be built on the north side of the new runway to provide easy access to and from the midfield terminal. The taxiway should be spaced for NLA standards to accommodate the future needs of the Airport.

Dual Cross-Field Connector Taxiways

With the addition of the new parallel runway to the south of the existing runway and the new midfield terminal complex, there is a need to connect the two runways and the terminal area to provide an easy transition for aircraft taxiing in and out of the terminal area. Based on this, it is recommended dual cross-field connector taxiways be provided for adequate airfield operational flexibility. Thee cross-field connectors should be adequately spaced to accommodate the movement of NLA aircraft.

5.4.4 New Large Aircraft

A new generation of aircraft is on the horizon, which could carry over 600 passengers and weigh over one million pounds. The first of these "New Large Aircraft" (NLA) is anticipated to make its first test flight in the year 2004 and enter the commercial market by 2006. Specific characteristics of these aircraft are not fully known at this time. However, the FAA has started to identify standards for these aircraft and assess how they will affect U.S. airports.

Until recently, Airport Reference Code (ARC) E-V was the most stringent category and included aircraft with an approach speed greater than 166 knots and a wingspan larger than 171 feet but smaller than 214 feet. This ARC represented aircraft such as the Boeing 747, Boeing 777, and the Airbus A340. NLAs will be much larger than the Boeing 747 and will become the largest aircraft in the commercial airline fleet. When the idea of a New Large Aircraft appeared to take shape, the FAA created a new category for those aircraft. Struggling to develop a design standard for NLA aircraft, manufacturers guaranteed that the aircraft would fit in a square of 262 feet by 262 feet. Based on this, the FAA created a sixth category for aircraft that would have a wingspan greater than 214 feet but less than 262 feet. Approach speeds for this Category are still unknown but are expected to be over 166 knots. However, until an additional approach category is warranted, NLAs will be included in the approach Category E Design Group VI (Table 5-4).

TABLE 5-4
AIRCRAFT REFERENCE CODE (ARC)

Aircraft Approach Category		Airplane Design Group	
Category	***Approach Speed***	***Group***	***Wingspan***
Category A	< 91 kt.	Group I	< 49 ft.
Category B	≥ 91 kt. but < 121 kt.	Group II	≥ 49 ft. but < 79 ft.
Category C	≥ 121 kt. but < 141 kt.	Group III	≥ 79 ft. but < 118 ft.
Category D	≥ 141 kt. but < 166 kt.	Group IV	≥ 118 ft. but < 171 ft.
Category E	≥ 166 kt.	Group V	≥ 171 ft. but < 214 ft.
		Group VI	≥ 214 ft. but < 262 ft.

Source: FAA AC 150/5300-Change 7

Advisory Circular 150/5300-13, Change 7, includes the addition of taxiway, runway and shoulder dimension at standards required to accommodate ARC E-VI aircraft. These dimensions will be outlined later in this section. The FAA has also issued the "New Large Aircraft Issues Document" with the goal of making airport planners and designers aware of all the issues associated with NLAs utilizing an airport. Although it is difficult to determine when the NLA will operate at RSW, a plan that is flexible enough to accommodate these aircraft in the future should be developed as the airport continues to expand. Currently, no facilities need to be designed to NLA standards but consideration should be given to the separation requirements of taxiways, taxilanes and runways to allow for easy expansion or modification of facilities to accommodate NLA's in the future. A number of important issues will be discussed in the following sections.

Runway Issues

Even if the definitive Maximum Take-Off Weight (MTOW) of NLAs is not known yet, it is certain that it will be more than the B747's MTOW. According to the manufacturers, the weight will be spread among the larger array of landing gear configurations. In doing so, the impact on the pavement should not be significantly more than that of a B747. Therefore, runways already designed to accommodate B747's may not need any reinforcement or pavement alterations. However, design criteria for airfield pavement has not yet been issued by any organization (either the FAA or ICAO). In the "New Large Aircraft Issues Document", the FAA does mention that pavement will most likely require a new composition or a new texture to obtain additional traction or braking efficiency. Again, this has not been confirmed.

While details of whether or not pavement for NLAs will require reinforcement remains unknown, the main gear and the wings are much wider. As such, it has been determined that the runway will also have to be wider in order to provide an appropriate safety margin. Furthermore, as the engines will be further from the centerline when compared to the B747, shoulders will also have to be widened in order to protect the engines from ingestion of foreign object debris.

Table 5-5 shows the comparison of runway characteristics for ADG-V and ADG-VI. If RSW were to serve NLA in the future, the indicated improvements would need to be made.

TABLE 5-5
RUNWAY CHARACTERISTICS

	Airplane Design Group	
	V (current)	**VI**
Runway Width	150 ft	200 ft
Runway Shoulder Width	35 ft	40 ft
Runway Blast Pad Width	220 ft	280 ft
Runway Blast Pad Length	400 ft	400 ft
Runway Safety Area Width	500 ft	500 ft
Runway Safety Area Length Beyond RW End	1,000 ft	1,000 ft
Runway Object Free Area Width	800 ft	800 ft
Runway Object Free Area length Beyond RW End	1,000 ft	1,000 ft

Source: FAA AC 150/5300-13 Chg 7

Taxiway Issues

The issues that were mentioned for the runways also apply to the taxiways. The pavement strength issues for taxiways are also unknown. Due to the anticipated larger wheel track and the larger wingspan of NLA's, taxiways will also have to be widened and shoulders extended to provide adequate safety margins. Moreover, engines may hang over dirt or grass areas and the higher engine thrust may exceed blast limitations. There will therefore be a higher risk of foreign object damage and blast of debris on the taxiways. This risk can be minimized if the shoulders are widened and the clearance with other aircraft and vehicles is increased. It should be noted that there may be different clearances depending on whether two or four engines are used to taxi. If only two engines are used, then the engine exhaust will be more geographically concentrated but also stronger in force. If all four engines are used, the force associated with each engine's exhaust will be less, but the overall blast will be more widespread. **Table 5-6,** outlines some of the taxiway characteristics as identified in FAA AC 150/5300-13.

TABLE 5-6
TAXIWAY CHARACTERISTICS

	Airplane Design Group	
	V (current)	**VI**
Taxiway Width	75 ft	100 ft
Taxiway Edge Safety Margin	15 ft	20 ft
Taxiway Shoulder Width	35 ft	40 ft
Taxiway Safety Area Width	214 ft	262 ft
Taxiway Object Free Area Width	320 ft	386 ft
Taxilane Object Free Area Width	276 ft	334 ft

Source: FAA AC 150/5300-13 Chg 7

Because of the larger wheel track and wheelbase, over-steering may require additional pavement to make a 90-degree or greater turn onto a taxiway centerline. In addition, if the nose wheel is turned too early, the taxiway fillet may not be large enough for the main landing gear. Therefore, taxiway/taxiway and taxiway/runway fillets may have to be increased. Furthermore, an important factor that will have to be taken into consideration is NLA taxiing speed. The speed may have to be reduced to ensure a more accurate track of the aircraft and to further protect the pavement.

Separation Standards

As a result of having a large wingspan, the NLA taxiway-to-taxiway separation and taxiway-to-runway separation standards increase significantly. These separation standards are perhaps the most critical to airport design as they will determine the overall layout and spacing of the runways and taxiways. Additionally, the actual proposed separations are significantly more than the previous category. As such, expansion to accommodate NLAs may be difficult for many airports if adequate provisions were not made during initial development. These new separations are described and compared in **Table 5-7.**

TABLE 5-7 STANDARD LATERAL SEPARATION STANDARDS		
	Airplane Design Group	
	V (current)	VI
Runway Centerline/Parallel Taxiway Centerline	400 ft	600 ft
Runway Centerline/Aircraft Parking Area	500 ft	500 ft
Taxiway Centerline/Parallel Taxiway Centerline	267 ft	324 ft
Taxiway Centerline/Fixed or Movable Object	160 ft	193 ft
Taxilane Centerline/Parallel Taxiway Centerline	245 ft	298 ft
Taxilane Centerline/Fixed or Movable Object	138 ft	167 ft

Source: FAA AC 150/5300-13 Chg 7

Terminal Apron Issues

It has been determined that NLA will more than likely require reconfiguring existing terminal parking aprons because of the length and wingspan of these aircraft. In a best-case scenario, an NLA could take the place of two adjacent parking positions, which accommodate B747 type aircraft. In order to prevent the NLA from impacting two parking spaces of smaller aircraft when parked in a jumbo aircraft gate, it was initially envisioned that an NLA could park parallel to another aircraft with its wings overlapping due to its high ground to wing height. However, after review of the initial designs of the aircraft, it appears that the wingtip clearance may not be high enough to enable this to occur. Furthermore, the existing passenger gates may not be compatible with those aircraft and multiple bridges may be required to unload passengers more efficiently. In addition, due to the wide wheelbase, the turning radius will be increased, making the maneuverability of the aircraft more difficult when docking at the gate positions. Additional visual or electronic aids may be required to help guide and safely maneuver the NLAs on the ramp. Lastly, since the NLAs will be heavier than any other commercial aircraft currently in service, their breakaway engine thrust (initial thrust needed to make the aircraft move) will be higher than any others. It will therefore increase the risk of damage caused by debris on the ramp. To reduce this risk, a greater separation between the aircraft and proximate aircraft and vehicles will have to be established.

Airfield Signage, Marking and Lighting Issues

Since the runways and taxiways will have to be widened to accommodate NLAs, the edge lights will have to be relocated. As such, special consideration should be given to the angle of the lights. NLA pilots have to be able to see the lights when they taxi on the ground. Therefore, the angle of illumination to the aircraft cockpit height may have to be slightly increased.

Signage at RSW designating taxiways, runways, ramp areas, hazards, and taxi instructions are located at certain distances from the taxiways and runways centerline based on B747 criteria. However, NLAs will be much larger than B747s and the distance between signs and centerline may need to be increased. In addition, due to anticipated cockpit height, the distance from the pilots' eyes to the airfield signs and markings will increase significantly. Characters, numbers and letters may become too small and not legible. Signage may have to be replaced and markings repainted to accommodate the mentioned possible vision impairments for the NLA pilots.

Areas restricted to NLAs will have to be marked accordingly. Special NLA holding bars will have to be created to ensure that the aircraft tail does not penetrate the Object Free Zone. Over steering lines should be marked as appropriate on the pavement to enable the NLAs to turn properly.

Taxi and Guidance Issues

To avoid confusion and to ensure that pilots do not use restricted taxiways, specific guidance and procedures may be required for ground movements and operations. One way to guide the pilots is to have an adequate signage and markings system as described in the previous section. Another way to provide this guidance and safety to the pilots is through the use of cameras on the aircraft. For example, having a camera installed on the nose wheel strut to ensure that the nose wheel remains on the centerline to make sure that the wing tip clearances are adhered to.

To further aid NLA aircraft maneuvering, other types of technology have also been explored and suggested. This includes the DGPS (Differential Global Positioning System), which would be able to provide enhanced navigation on the ground. However, it is still under development as accuracy must be refined for such operations. Additionally, another type of GPS technology that may be available is the GPS/ADS-B (Automatic Dependent Surveillance-Broadcast). This system uses the accuracy of the information provided by the GPS system via a data link. It reports the position of an aircraft to the aircraft itself, to other aircraft and to air traffic control. Lastly, tracking wires embedded in the pavement have also been suggested and could provide an alternative solution.

Ground Service Issues

The unique dimensions of NLA will more than likely require new ground service equipment. Ground service personnel may also need specialized training when working on NLA's. For instance, the size of cargo containers may be too large or too heavy to be processed by regular load vehicles and ramps. Tugs may need additional power and greater traction to be able to tow NLA's in adverse weather conditions. Furthermore, those vehicles may require more resistance to the speed and heat of the exhaust blast or engine intake of NLAs. Thrust deflecting may even be required to protect the ground crew.

5.4.5 Pavement Marking

As mentioned in the Inventory Chapter, all pavement marking at RSW visually appears adequate and in good condition. Both Runway 6 and Runway 24 are marked as precision instrument runways and need no additional marking. Precision instrument runway markings consist of runway designation markers, a centerline stripe, threshold bars, threshold markings, aiming point markers, touchdown zone stripes, and side stripes indicating the extent of the full strength pavement. Currently the runway hold short markings are being re-striped at all taxiway runway intersections to comply with FAA requirements. The taxiways are also marked with centerline, edge, and sidebar striping, as well as hold line markings adjacent to the runway. When the runway is rehabilitated the markings will need to be repainted. Additionally, the future runway should reflect a similar level of marking. The existing runway marking will need to be modified to reflect a 6L-24R designation when the new runway is constructed. As such, the new runway will also need to be properly marked as 6R-24L.

5.4.6 Signage

Currently, there are approximately eighty-two lighted signs on the taxiways and runway at RSW to safely guide aircraft and ground vehicles. As determined in the inventory process, all signage at RSW is in good condition and should be updated when deemed appropriate by the Lee County Port Authority. As additional pavements are added, signage will need to be included and particular consideration should be given to potential signage modifications. For example, when the new runway is added, existing runway signage will need to be changed to reflect a 6L-24R designation. The same holds true for the new runway with a 6R-24L designation.

5.4.7 Airfield Lighting

When meteorological conditions are not optimum, a lighting system helps pilots using an airport to safely land and taxi on the airfield. If the system shows deficiencies, its utilization can then become dangerous as pilots may interpret a missing light in a straight line as a beginning of a turn. Therefore, daily care must be given to the system to ensure that every light is properly working and that no lights are obstructed by shrubbery or other objects. The following sections provide recommendations for future facility requirements for airfield lighting at RSW.

Runway Lighting

According to FAA AC 150/5340, High Intensity Runway Lights (HIRL) are required for a precision approach runway. RSW currently has HIRL lighting and satisfies all precision approach runway requirements relative to lighting. As mentioned in the Inventory Chapter of this master plan, no centerline or touchdown zone lighting systems are in place at RSW. Runway centerline and touchdown zone lighting systems are designed to facilitate landings, rollouts, and takeoffs. These systems are not required for a Category I runway. However, should RSW upgrade the runway to a Category II designation, runway centerline lighting and touchdown zone lights will be required (AC 150/5340-4C, Change 2). Additionally, if the runway remains a Category I runway and is widened to 200 feet to satisfy future new large aircraft requirements, the FAA recommends that centerline lighting be implemented. On this basis, it is recommended that the future runway be equipped with both edge and centerline lighting.

Taxiway Lighting

As mentioned in the Inventory Chapter, taxiway lighting is essential to safe operations during low visibility conditions and nighttime operations at an airport. Taxiway lights allow pilots to maneuver to and from the active runways, terminals and hangars. Taxiway edge lights also provide surface guidance to other ground vehicles on the airport. Currently, taxiway edge lighting, corner barrel reflectors, or centerline lighting is installed on all taxiways at RSW with the exception of the GA taxiway leading to the FBO. As the Midfield Terminal Complex is scheduled for completion in 2005, no additional taxiway lighting is recommended for the current RSW taxiway system configuration. However, with the addition of a new midfield taxiway system, centerline lighting for all associated taxiways is recommended. It is also less costly to install taxiway centerline lighting during initial construction, which will allow for the Airport to implement a Surface Movement Guidance Control System (SMGCS). This system will enhance safety for aircraft operating on the taxiway system under low visibility weather conditions.

5.4.8 Navaids

Airport Surveillance Radar (ASR)

The Airport Surveillance Radar is located approximately 1.5 miles north-northwest of the airport reference point (ARP). The current ASR is a FAA designated Series-8 radar with a critical area that encompasses approximately 40,000 square feet of land. An ASR-11, proposed by the FAA, is envisaged to be installed approximately 200 feet east-southeast of the existing ASR-8 facility. Signal deviations, caused by obstacles such as buildings, trees or vehicles, require that the ASR-11 be located at least 1,500 feet from any tall building or object which may cause signal deviations and at least one-half mile from any other electronic equipment. Future upgrades will depend on the FAA facility and system requirements.

The current location of the area surrounding the ASR northwest of the existing terminal is ideally suited for industrial/commercial use land since it is located in close proximity of both Chamberlin Parkway and Daniels Parkway. The FAA has indicated that development may be acceptable within the defined critical area if the heights of the buildings are controlled. It is recommended that before any planned development is considered in the ASR critical area coordination with the FAA take place early in the planning process.

Global Position System (GPS)

According to the FAA, precision GPS approaches are slated to become the industry standard in approximately five to seven years from the implementation of the RSW master plan update through the use of either the Wide Area Augmentation System (WAAS) or Local Area Augmentation System (LAAS). WAAS provides the required accuracy, availability and integrity to support GPS use as a primary means of navigation during all phases of flight through Category I Precision Approaches. The WAAS will improve basic GPS service to approximately seven meters vertically and horizontally. On-airport systems are not required to achieve a WAAS supported Category I precision approach and as such, a single WAAS is expected to have the ability to support multiple regional airports. LAAS is intended to support approaches to Category I minimums in those instances where WAAS cannot provide the necessary satellite coverage to achieve Category II and Category III precision capabilities. LAAS accomplishes this by using ground stations located at the airport to transmit signals with the highest level of accuracy to the aircraft making an approach. LAAS is expected to be accurate to within one meter or less and a single LAAS system can support approaches to multiple runway ends.

Currently, non-precision GPS approaches are available at RSW. However, as LAAS and WAAS become available in the future, these options may prove to be a viable alternative to upgrade the current system to Category II or Category III standards. As GPS approaches are slated to become the standard, such a system would enable RSW to upgrade its instrument approach Category for each runway end without requiring the costly implementation of ILS equipment. This cost savings may be especially advantageous to the proposed parallel runway complex. As details relative to the siting of GPS equipment are defined, the associated requirements of such should be reviewed relative to RSW.

Instrument Landing Systems

To enhance overall airport capacity and safety during adverse weather conditions, upgrade of the Airport's precision instrument approach may be warranted. RSW currently has a Category I ILS procedure for Runway 6 only. This approach permits pilots to descend to 200 feet above the touchdown zone elevation and a runway visual range of not less than 1,800 feet. A Category II procedure provides for approaches to a height above touchdown elevation of not less than 100 feet and with runway visual range of not less than 1,200 feet. Requirements to upgrade the current Category I ILS to a Category II ILS include additional Runway Visual Range (RVR) Equipment, an increase in the size of the ILS critical area, an upgraded approach lighting system, and runway centerline and touchdown zone lighting systems. It is recommended that at least one Category II approach be considered for the Airport for operating the primary configuration (west to east). This should consider either an upgrade of the current ILS Category I approach to a Category II for the existing Runway 6 or for the same end of the new parallel runway. The latter, however, would require relocation at the existing three sets of power lines to remove signal distortion. Finally, it is recommended that consideration be given to implement Category I precision approach capabilities (either ILS or GPS) for all remaining runway ends.

Approach Lighting System (ALS)

Currently, RSW has a Medium Intensity Approach Lighting System (MALSR) designated for use with a Category I runway. The system is installed at the Runway 6 approach end. Should the Airport upgrade to Category II standards, an ALSF-2 will be required. An ALSF-2 is an approach lighting system with sequenced flashing lights arranged specifically for Category II and III runways. Additionally, if other precision approaches are implemented, proper provisions should be made to install the required lighting system for the planned approach. As such, the identification of the specific lighting system for each runway end is dependent on which end will have a Category II precision approach. MALSR's should be added in a phased approach to all other runway ends to provide full Category I capabilities.

5.4.9 Visual Landing Aids

As noted in the Inventory Chapter, the Runway 6 and Runway 24 end at RSW both provide ground based visual aids known as Visual Approach Slope Indicators (VASI). They are considered to be in good to fair condition. However, the VASI system is becoming outdated and the FAA has recommended that existing VASIs be replaced with Precision Approach Path Indicators (PAPIs) when their useful life has expired. This is recommended since VASIs are no longer produced and replacement parts are increasingly difficult to obtain. Additionally, PAPIs provide a more accurate interpretation of glidepath establishment for pilots. The future runway should be equipped with PAPIs serving each runway end during its initial construction.

5.4.10 Helicopter Operations

Currently, there are no designated helipads at RSW and helicopter operations are minimal at the Airport. However, as rotorcraft operations have steadily increased over the past couple of years in the State of Florida, the addition of such facilities should be planned to accommodate potential future helicopter operations at the Airport. An FAA based helipad provides a controlled area for a rotorcraft to initiate takeoffs and landings. Both a helipad and a helicopter parking area are important facilities for the safe operation of helicopters at an airport. It is anticipated that rotorcraft operations will continue to grow in the region, as is evident at nearby airfields such as Page Field and Naples.

The type of heliport demand at RSW would most likely be for a general aviation facility since the Airport is not located near a hospital, nor does it provide a market for larger transport commercial helicopters. FAA AC 150/5390-2A, *Heliport Design*, requires that a public-use general aviation heliport have at least one Final Approach and Takeoff Area (FATO). This area should be graded to assure proper drainage but should not exceed two percent in any area where a helicopter is expected to land. The Touchdown and Lift-off Area (TLOF) is centered in the FATO. The size of the FATO, TLOF, the safety area surrounding the FATO and the pavement strength depends on the design helicopter. By definition, the design helicopter is a generic helicopter, which represents the maximum weight, overall length, skid/wheel base and rotor diameter of all the helicopters expected to operate at the facility. Since no regular helicopter traffic currently exists at RSW, a design helicopter utilizing the nearest airport, Page Field (FMY), was used. The design helicopter in the current Page Field Master Plan is the Bell Jet Ranger. The characteristics of this helicopter are shown in **Table 5-7**.

TABLE 5-7
HELICOPTER CHARACTERISTICS

Max Takeoff Weight	4,450 lbs
Overall Length	43 feet
Rotor Diameter	37 feet
Undercarriage skid length	9.9 feet
Undercarriage skid width	7.2 feet

From these characteristics and the criteria for heliport design found in AC 150/5390-2A, the area for a heliport was calculated to be approximately 11,000 square feet, including the safety area, the FATO and the TLOF. It is recommended that one heliport area of the calculated size be designated at RSW with enough space to expand for future facilities. In addition, the location and required land needed for such a heliport is also based on compatibility with imaginary surfaces as set forth in FAA CFR 14, Part 77, *Objects Affecting Navigable Airspace*. It is therefore recommended that a Part 77 analysis be conducted for any proposed helicopter operation area.

5.5 LANDSIDE REQUIREMENTS

5.5.1 Terminal Requirements

The high rate of historical passenger growth, increasing operations and current facility constraints have forced the LCPA to consider a long term solution to addressing terminal capacity shortfalls at RSW. As such, the potential for a midfield terminal with unimpeded access to both the existing and future parallel runways has been the subject of growing scrutiny over the past ten years. During a very intensive effort over the past 3 years, this has culminated into the Midfield Terminal Development Program. The first phase of the development program, currently in implementation, has been the subject of an extensive programming effort. Due to this, it is not the intent of terminal analysis outlined herein to readdress the initial phase of terminal development. Rather, this analysis will summarize the first phase of development and then outline the additional development that might be expected to adequately provide for terminal expansion throughout the balance of the 20-year planning period.

Overview of the Midfield Program

In the year 2000, a study was conducted by DMJM Aviation that considered a new Midfield Terminal at RSW. This study outlined a conceptual program of terminal space and identified and assessed numerous terminal alternatives. The resulting preferred alternative was broken into phases and further refined based on both the design activity levels outlined in **Table 5-8** and the specific facility requests of the tenants and users. The activity levels used in outlining the first phase of development correspond to the 2010 projection of activity outlined by Leigh Fisher and Associates' Forecast Activity report prepared in 1995.

TABLE 5-8
ACTIVITY LEVELS USED FOR THE MIDFIELD TERMINAL STUDY

Annual	
Enplanements	4.5 million passengers
Departures	52,600 operations
Peak Month	
Peak Month Ratio	10.9%
Departures during Peak Month	5,734 operations
Average Day	
Average Day Ratio	3.23%
Daily Departures	185 operations
Daily Passenger Enplanements	20,457 passengers
Peak Hour	
Enplanements	2,599 passengers
Deplanements	3,132 passengers
Aircraft Departures	22
Aircraft Arrivals	26

Source: DMJM AVIATION

As outlined in **Table 5-9** the first phase of Midfield Terminal development program includes 28 gates, 120 ticket counters, 10 baggage claim devices and over 760,000 square foot of terminal space.

TABLE 5-9 FIRST PHASE MIDFIELD TERMINAL SUMMARY	
Number of Gates	28
Number of Ticket Counters	120
Number of Baggage Claim Devices	10
Space Summary	**Area (square feet)**
Airline Operations	21,143
In Transit Lounge	4,334
FIS	39,903
Ticketing	6,224
ATO	16,770
Holdrooms	73,860
Baggage Makeup	83,514
Baggage Claim	75,090
Baggage Offices	6,015
Concessions	41,228
General Circulation	159,339
Ticketing Lobby/Screening	60,071
Toilets	23,938
Support/Mechanical	74,964
Airport Administration	68,451
Unassigned	11,365
Total Space	**766,209**

Source: Spillis Candella DMJM 5-22-02

The ultimate design, configuration and layout of the midfield facilities include three terminals and five concourses with the ability to support 65 gates. The first phase of development includes a single terminal building serving three concourses, which support a range of aircraft sizes (**Table 5-10**). The layout and configuration of first phase allows for the expansion of each of the three concourses to provide a net increase of four gates each, prior to the need to construct a second terminal building.

TABLE 5-10 GATE BREAKDOWN	
Type of Aircraft	**Number**
Commuters	1
Large Narrowbody	20
Medium Widebody	6
Large Widebody	1
Total	**28**

Source: DMJM AVIATION

Additional improvements programmed as part of the first phase of the midfield program include the following:

- Surface parking
- Three-story parking garage
- Toll plaza complex

- Rental car customer service buildings
- 8 rental car quick return maintenance facilities
- Rental car fuel facility
- Taxicab limousine building
- Chiller plant
- Belly-haul cargo building

In reviewing the design levels outlined in **Table 5-8** against the new forecasts outlined in this master plan, it can be determined that the peak hour design levels roughly correspond to 2012 activity levels. This indicates that the first phase of the midfield development should be adequate, at least from a space perspective, throughout the short and intermediate term development periods. However, based on the analysis outlined in the following section it appears that consideration of additional gates may be required during this period.

Future Gate Requirements

One of the most important attributes of a terminal is its number of aircraft parking positions or 'gates'. If a terminal has too few gates, the airport may not be able to accommodate airline or passenger demand, or attract additional carrier service. If there are too many, the airport may have needlessly expended resources that could have been better used elsewhere. It is consequently important to try to get a good feel for actual gate demand prior to construction and to outline terminal development strategies that allow for easy gate expansion if demand requires. Two techniques for determining gate requirements are outlined in this section. The first considers peak hour demand and gate utilization rates. The second considers the number of total annual enplanements per gate. The results of each will be reviewed relative to the first phase of the midfield terminal development to determine potential shortfalls throughout the planning period.

Peak Hour Demand Methodology

One of the methods to calculate the number of gates required, suggested by the FAA in AC 150/5360, is to use a peak hour gate utilization rate. This rate can then be applied to future activity levels to estimate future gate requirements.

In 2000, there were 21 domestic aircraft operations during peak hour. Out of the 17 existing gates, one was assumed to be reserved for an international flight. Therefore, 16 gates were available to accommodate those 21 domestic movements. That means that on average each gate accommodated 21/16=1.3125 movements during the peak hour. According to the FAA, a domestic gate utilization factor typically should fall between 0.9 and 1.1. The utilization of gates at RSW is more than 20 percent higher than the FAA's "typical" range. This is an indicator of saturation during the peak hour and is readily apparent in considering the extreme congestion being experienced during existing peak periods at RSW. Therefore, in improving the level of service and providing greater flexibility during the peak hour, a utilization rate lower than that currently experienced should be used for projecting the number of domestic gates. For long range planning purposes it was assumed that a utilization factor of 1.1, at the high end of the FAA's range, would be reasonable. If the current gate utilization rate was 1.1, the airport would have 19 domestic gates available, rather than the current 16. This would reduce peak hour congestion, increase the level of service, and better position the airport to attract new air service. Utilizing the 1.1 factor, it was projected that the total domestic gates required in 2010 would increase to 29 and, by 2020 to 39.

With respect to international activity, only one operation is anticipated during the peak hour through 2020. Therefore, a single international gate should be adequate to enable the accommodation of the international flight. However, as international operations typically have a greater turnaround time than domestic activity, an additional position or 'swing' gate may require consideration due to the increased potential for operational overlap.

Commuters and regional jets (RJ) have shorter turnaround times than commercial jet aircraft and a single position can typically handle multiple operations during a single hour period. With a turnaround time as short as 20 minutes, a single gate position can typically handle three operations (arrivals plus departures) during a single hour. According to the forecasts, the number of commuter/RJ operations during peak hour will increase from five to eight between 2005 and 2020. Based on three operations per hour, two commuter positions will be required through 2010 with an additional position by 2020.

Table 5-11 summarizes the gate requirements using the peak hour utilization methodology.

TABLE 5-11
GATES REQUIRED – PEAK HOUR UTILIZATION METHODOLOGY

	2005	**2010**	**2020**
Domestic Air Carriers	25	29	39
International Air Carriers	1	1	1
Commuters/Regionals	2	2	3
Total	**28**	**32**	**43**

Source: Birk Hillman Consultants, Inc.

Annual Enplanement Methodology

The ratio of annual enplanements per gate can often be used as a good indicator of future gate requirements. The higher the overall activity level and the flatter the peaks, the higher the likely ratio of enplanements per gate. This section outlines gate requirements using an annual enplanement throughput methodology.

Commuter, domestic, and international gates each typically support different levels of annual passenger activity. Although commuter gates can accomplish more turns in a given hour, the limited seating capacity usually results in the lowest volume of enplanements per gate. In defining the future gate requirements, an 80,000 annual enplanement level was estimated as an average throughput that might be expected at RSW. Domestic gates, typically serving a range of narrowbody aircraft, provide a higher annual enplanement volume, which could be expected to range between 115,000 and 140,000 annual enplanements per gate. Given the peaking characteristics of RSW, 125,000 enplanements per domestic gate was used as a reasonable estimate of throughput. Finally, international gates typically have the highest annual passenger throughput due to the larger aircraft that these gates typically serve. While international gates can typically accommodate between 150,000 and 200,000 annual enplanements, it is anticipated that throughput at RSW will fall at the low end of that range. This is due to the inefficiencies that are typical with the relatively low volume of international activity. Projected gates using the annual enplanement methodology are outlined in **Table 5-12**.

TABLE 5-12
GATES REQUIRED – ANNUAL ENPLANEMENT METHODOLOGY

	2005	2010	2020
Domestic (Air Carriers)	24	29	41
International	1	1	2
Commuters/Regionals	3	3	4
Total	**28**	**33**	**47**

Source: Birk Hillman Consultants, Inc.

Summary of Gate Requirements

Both the peaking methodology and the annual enplanement methodology project a need for 28 total gate positions by 2005. By 2010, the total number of gates required is estimated at between 32 and 33. This indicates the need for additional gate development beyond that currently programmed in the first phase of the Midfield Terminal Development Program. By 2020, the estimated number of gates required will increase to between 43 and 47 or an additional 10 to 15 gates over the 2010 levels. Finally, an estimated ultimate gate capacity of 65, it appears that the midfield terminal complex will therefore be adequate to accommodate gate requirements throughout the 20-year planning period.

Space Requirements

To determine long-range terminal space requirements, the design activity levels for the first phase of the Midfield Terminal Development Program were compared to the projected 2010 and 2020 activity levels. The profile of space for the midfield was then used to project future space shortfalls based on the respective ratios of peak hour enplanements or deplanements for the given development period. Because 2010 projected activity levels were below the Phase 1 Midfield Design levels, the only projected space shortfall is the holdroom space required to accommodate the additional gates that were identified in the previous section. However, by 2020 most use classifications other than those associated with international activity will require additional space. Due to the relatively low projected levels for international activity, it was assumed that the Phase 1 FIS and In-Transit Lounge would be adequate to serve the projected demand throughout the planning period.

As outlined in **Table 5-13**, it is projected that a space shortfall of 10,600 square feet will exist by 2010 and that this shortfall will increase to almost 205,000 square feet by 2020.

TABLE 5-13 PROJECTED TERMINAL SHORTFALLS			
Planning Criteria	**Phase 1 Midfield**	**2010**	**2020**
Annual Enplanements (Pax)	4.5 million	3.98 million	5.63 million
PH Enplanements	2,599	2,372	3,307
PH Deplanements	3,132	2,948	4,073
		Facility Shortfalls	
Number of Gates	28	4-5	15-19
Number of Ticket Counters	120		33
Number of Baggage Claim Devices	10		3
		Space Shortfalls	
	(square feet)	**(square feet)**	**(square feet)**
Airline Operations	21,143		5,429
In Transit Lounge	4,334		
FIS	39,903		
Ticketing	6,224		1,693
ATO	16,770		
Holdrooms	73,860	10,600	38,400
Baggage Makeup	83,514		22,715
Baggage Claim	75,090		22,527
Baggage Offices	6,015		1,805
Concessions	41,228		15,783
General Circulation	159,339		33,193
Ticketing Lobby/Screening	60,071		16,339
Toilets	23,938		7,181
Support/Mechanical	74,964		21,228
Airport Administration	68,451		18,619
Unassigned	11,365		-
Total Space	**766,209**	**10,600**	**204,912**

Note: 2020 number represent total deficit versus Phase 1 midfield.
Source: Spillis Candella DMJM 5-22-02; Birk Hillman Consultants analysis 2002

Finally, the existing terminal is already capacity constrained. This will likely worsen considerably by the time the new terminal is opened in 2005. To minimize these problems until the midfield terminal complex is completed, both operational and facility modifications will be required. This includes possible modification of airline agreements, reallocation of resources, and use of temporary measures for accommodating activities during peak periods. In addition, a communications link between the existing terminal and the midfield terminal will be required to coordinate operations during the transition of operations.

5.5.2 Parking Requirements

Current Conditions

As previously outlined in the Inventory Chapter, the current number of available automobile parking spaces at Southwest Florida International Airport (RSW) is 4,905 spaces (including those currently under construction) and is shown below in **Table 5-14**. Short-term and long-term parking consists of 2,356 spaces, economy parking includes 1,935 spaces and employee parking consists of 614 spaces. Rental cars currently have their own lots (separate from the terminal parking area) in which automobiles are stored and are accessed by passengers via shuttle buses from the terminal area.

TABLE 5-14
EXISTING AUTOMOBILE PARKING

Facility	Total Spaces
Short-term parking	735
Long-term parking	1,621
Economy parking	1,935
Employee parking	614
Rental car parking	-
Total	**4,905**

Source: LCPA

Midfield Terminal Complex Parking

The construction of the new Midfield Terminal Complex will make available a significant amount of additional auto parking spaces to the traveling public. The Midfield Terminal Complex is scheduled to be operational during the second quarter of 2005. It is anticipated that a total of 14,399 parking spaces will be incorporated into the construction of the new terminal as illustrated in **Table 5-15**. The Midfield Terminal design includes both structural and surface auto parking. The parking garage will be conveniently located to the new terminal building and will consist of three levels. The structure has also been designed to be able to accommodate two additional levels for future expansion. The first level of the garage will be dedicated to rental car operations and will contain 1,500 spaces. The second and third levels of the garage will contain 2,519 spaces (1,330 on level two and 1,189 on level three) and will be used for hourly parking. It is anticipated that the rental car operators will continue to utilize the off-site location currently in use for additional rental car overflow storage. This overflow storage demand can be substantial. For example, during 2000, the peak season rental car fleet at RSW totaled 17,400 vehicles. The ground level access for the rental car area will be via the terminal access road. The hourly parking will also access the garage via the terminal access road but will be isolated from the rental cars.

TABLE 5-15 MIDFIELD TERMINAL PARKING*	
Car Rental Ready/Return	1,500
Short-term	2,519
Long-term	8,942
Employee	1,288
Taxi	85
Limousine	45
Toll Booth	20
Total	**14,399**
*The Midfield Terminal is scheduled to open the second quarter of 2005	

Source: LCPA

Access to the 8,942 space surface daily parking lot will be via the terminal area access roadway and also from the recirculation roadway. The 1,288-space employee parking lot will be outside the terminal access loop road and west of the daily lot. The 130-space limousine and taxi parking lot is also outside the terminal access loop road and south of the daily lot. The 20-space tollbooth employee parking is located adjacent to the toll facilities. Because of the walking distances to the new terminal building, users of the surface daily lot and employee parking will utilize a shuttle bus system.

Projected Parking Demand

Hourly and Daily Demand

Auto parking requirements for the Midfield Terminal provide 2.5 auto parking spaces per 1,000 annual enplanements for the traveling public. This ratio does not include spaces for rental cars, employees or other ancillary uses. A design criteria of 4.5 million enplanements was utilized resulting in a requirement of 11,250 spaces for hourly and daily parking demand. For the purposes of this analysis, the same ratio was utilized for the Master Plan and applied against the approved enplanement forecasts for RSW. This analysis, completed for 2005, 2010, and 2020 is shown in **Table 5-16** and results in a total of 14,068 hourly and daily auto parking spaces required by the year 2020. The auto parking spaces are further delineated into hourly and daily requirements. Percentage splits of 17 percent hourly and 83 percent daily were used for both the Midfield Terminal Project and for the 20-year planning horizon. It is recommended that an additional 443 spaces for daily use and 2,164 spaces for hourly use be constructed by 2020.

Consideration should be given for 200 spaces adjacent to the terminal on the lower level to accommodate an hourly lot for “meeters and greeters” of arriving flights. This lot should be strictly policed to ensure short occupancy times for quick turnover. If this lot is constructed, the spaces constructed should be subtracted from the hourly lot demand.

Rental Car Demand

The initial construction of the Midfield Terminal will provide 1,500 rental car ready return spaces. It is estimated that the initial allocation will be adequate through 2010, but an additional 1,500 spaces are anticipated by 2020. These estimates should be further refined by discussions with the rental car companies to better estimate actual demand.

Employee Lot Demand

The employee parking lot was sized to accommodate shift changes, which at times overwhelms the existing employee parking lot. It is anticipated that expansion of this lot will be necessary in conjunction with future enplanement growth, which will require additional employees. An additional 400 spaces are recommended for 2020.

Taxi and Limousine Parking Demand

The limousine and taxi parking lot will also require expansion to accommodate additional passengers. An additional 50 spaces are recommended by 2020.

Summary

Table 5-16, summarizes the current capacity and future demand of automobile parking at RSW. As depicted in the table, the current parking spaces available will be able to surpass those demanded through 2005. It is recommended that 719 spaces be constructed for 2010 and 4,557 spaces be constructed by 2020.

TABLE 5-16 FUTURE PARKING REQUIREMENTS			
Year	**2005**	**2010**	**2020**
Annual Enplanements	**3,294,000**	**3,978,800**	**5,627,100**
Passenger Parking Requirements	**8,235**	**9,947**	**14,068**
Hourly (17%)	1,340	1,691	2,392
Daily (83%)	6,895	8,256	11,676
Existing Space	**11,461**	**11,461**	**11,461**
Hourly (17%)	2,519	2,519	2,519
Daily (83%)	8,942	8,942	8,942
Surplus/Deficiency	**3,226**	**1,514**	**(2,607)**
Hourly (17%)	548	257	(443)
Daily (83%)	2,678	1,257	(2,164)
Rental Car Requirements	**1,500**	**2,250**	**3,000**
Existing Spaces	1,500	1,500	1,500
Surplus Deficiency	0	(750)	(1,500)
Employee Parking Requirements	**1,288**	**1,288**	**1,688**
Existing Spaces	1,288	1,288	1,288
Surplus Deficiency	0	0	(400)
Taxi and Limo Parking Requirements	**130**	**130**	**180**
Existing Spaces	130	130	180
Surplus Deficiency	0	0	(50)
Toll Booth Employee Requirements	**20**	**20**	**20**
Existing Spaces	20	20	20
Surplus Deficiency	0	0	0
TOTAL SPACES REQUIRED	**11,173**	**13,635**	**18,956**
TOTAL EXISTING SPACES	**14,399**	**14,399**	**14,399**
TOTAL SURPLUS/DEFFICIENCY	**3,226**	**764**	**(4,557)**

Source: RS&H 2001
**A 200 space meeter and greeter lot is recommended. If this lot is constructed, 200 spaces should be subtracted from the hourly requirements.*

5.5.3 Access Roads

The requirements for airport access roads will be addressed as part of this Master Plan and are incorporated in Section 5.10 of this Chapter, "Airport Access".

5.6 AVIATION SUPPORT FACILITIES

5.6.1 Airport Maintenance

A new 11,000 square foot Vehicle Maintenance Building and a 4,800 square foot covered storage area have recently been constructed west of the original facilities. The original airport maintenance facility, encompassing 1.65 acres and consisting of a 12,000 square foot building, is expected to remain in operation as a maintenance field shop. It is located north of the runway and in the northwest corner of the Airport. The Airport Maintenance Department, which conducts the airport maintenance, is divided into four (4) groups, airfield, grounds, terminal, and vehicle maintenance. It has not been determined where each department will be located. Regardless, a service road is recommended to connect both the existing and new maintenance facilities without having to use the public roadway. In the event that the operations of the maintenance facilities reach capacity, the new maintenance facility possesses ample space for expansion.

5.6.2 Aircraft Maintenance Facilities

An increase in operations at RSW creates the demand for additional aircraft maintenance. Two (2) new facilities have previously been discussed in the Inventory section of this report; a large aircraft maintenance facility and a general aviation maintenance facility. The proposed large aircraft maintenance facility would support Boeing 747s or equivalent sized aircraft. As Miami International Airport is becoming saturated with large aircraft maintenance facilities, RSW represents a viable alternative location for such operations. RSW is not at a great distance from Miami and has the proper facilities, i.e. runway length and pavement strength, to support aircraft like the Boeing 747. Furthermore, RSW has fewer operations than Miami International Airport and it would thus be able to provide a more efficient maintenance operation without traffic and space constraints. Thus, it is recommended that land be set aside to provide for a large aircraft maintenance complex with a single initial phase hangar expandable to include at least two additional hangars. Provisions will need to be made for a hush-house or engine run-up facility to mitigate the potential noise increase associated with such an operation.

A general aviation maintenance facility for larger GA aircraft including jets would accommodate the increase in larger general aviation aircraft expected to operate at RSW in the future. Currently, the FBO at the Airport utilizes half of a 26,000 square foot hangar for such an operation. The other half of the hangar is used for storage and is limited in size for specific maintenance work. Since a new larger FBO facility is expected to be constructed at the Airport to attract larger general aviation aircraft including jets, a larger or new aircraft maintenance facility will be required. Thus, it is recommended that space be equivalent to that available in the current hangar be used exclusively for aircraft maintenance by 2010 and that space will be set aside to allow for expansion by an additional 10,000 square feet by 2020.

5.6.3 Airport Rescue and Fire-Fighting (ARFF)

According to the FAA, airports that serve any scheduled or unscheduled passenger activities of an air carrier with a passenger seating capacity of more than 30 seats must comply with FAR Part 139. FAR Part 139 outlines the requirements for each ARFF Index at an airport according to the length of aircraft frequently using the Airport. An aircraft frequently using the Airport experiences an average of five (5) daily departures from the Airport. The levels of protection are indicated by the different Indexes shown in **Table 5-17**.

TABLE 5-17 ARFF AIRPORT INDEX	
AIRPORT INDEX	**AIRCRAFT OVERALL LENGTH**
A	<90'
B	90' to <126'
C	126' to <159'
D	159' to <200'
E	200' and >

Source: FAA Far Part 139

As mentioned previously, Southwest Florida International Airport's ARFF activity levels currently require an FAA ARFF Index of D. However, it is anticipated that future activity of increasingly larger aircraft may require the Airport increase to an Index E rating. **Table 5-18** outlines the current airport equipment along with the requirements for both indexes D and E.

TABLE 5-18 ARFF EQUIPMENT REQUIREMENTS				
Designation	**Equipment Type**	**Water (gal.)**	**AFFF 3% (gal.)**	**Halon (lbs.)**
CFR 901	Oshkosh T-1500	1,500	205	500
CFR 903	Oshkosh T-1500	1,500	205	500
CFR 908	Oshkosh T-3000	3,000	405	0
Total		**6,000**	**815**	**1,000**
Index D Requirement		**5,000**	**100**	**500**
Index E Requirement		**6,000**	**100**	**500**

Source: Birk Hillman Consultants Inc., 2001

As outlined in **Table 5-18**, the existing equipment is capable of meeting the equipment requirements for both D and E indexes.

FAR Part 139 requires at least one ARFF vehicle to reach the midpoint of the farthest runway serving air carrier aircraft within three (3) minutes from the time of an alarm, from its assigned post, and that vehicle must be able to begin application of water foam, dry chemical, or halon 1211. Additionally, all other required ARFF vehicles are required to reach the same point within four (4) minutes of the alarm and begin their tasks. The ARFF is properly located for current operations at RSW. However, when the Midfield Terminal Complex and parallel runway alternatives are implemented, difficulty in complying with response requirements set by the FAA will likely require either relocation of the existing facility or development of a supplemental facility. It is recommended that alternatives for both be further explored based on the results of response times, cost of construction and operation, proximity to other facilities, and surveillance of airport operations area. As such, additional equipment may be required depending on the option selected. Regardless, periodic replacement of major equipment should be programmed to ensure the equipment available continues to meet performance requirements.

5.6.4 Fuel Storage Requirements

Planning for the storage of fuel to serve aircraft demand requires consideration of not only future operational demand but also fuel settling requirements, how fuel is transported to the Airport, the reliability of the supply and major changes to the aircraft stage lengths. Typically, fuel storage for 2-3 days provides adequate supply. However, if the fuel is coming from an area located at a significant distance from the fuel storage locations, these storage requirements could be double or more, especially in areas highly susceptible to major weather events or traffic delays. Fuel at RSW is tankered to the Airport by trucks from Tampa. Tampa is located approximately 140 miles from Fort Myers. Therefore, to be safe it is recommended that the fuel and supply at RSW be between 5-7 days and no less than 2-3 days at any time.

It was noted in the inventory that there are two fuel farms located at the Airport, one serving GA, and the other serving the commercial service airlines. The commercial fuel storage and hydrant-fueling facility owned by the Lee County Port Authority consists of three (3) 420,000-gallon Jet-A fuel tanks. Therefore, the current fuel storage capacity is 1,260,000 gallons plus an additional 70,000 gallons in the hydrant piping system. Fuel flowage records show that the average daily flow of Jet-A for the Year 2000 was 114,032 gallons. During the peak month, March of 2000, the recorded fuel flowage was 4,851,493 gallons, resulting in an average daily flowage of 156,500 gallons. In addition, the peak month for the Year 2001 recorded a flowage of 5,635,848 gallons, representing an increase of 784,355 gallons or 1.6 percent. Industry standards depict that a five to seven day storage capacity at the fuel farm at all planning levels would satisfy the appropriate level of service required at the Airport.

Future demand for aircraft fuel is driven primarily by the expected number of aircraft operations. Because no historical fuel sales information was available, an estimate of the approximate gallons of fuel per flight was used. This estimation varied depending on the fuel farm being analyzed. The main commercial operations fuel farm serves considerably larger aircraft that, on average, will be traveling much greater distances than the aircraft being serviced at the FBO. Therefore, the ratio assumed for the commercial operations equals 700 gallons of fuel per peak month jet operation. The ratio used for the GA/FBO analysis equals ten (10) gallons of fuel per each peak month for piston operations and 125 gallon per peak month for jet operations. This value is based on information from other airports with operations similar to that at RSW. To determine the existing supply in days the following formula was used:

Peak Month Demand / 30 (avg. # of days in a month) = Peak Day Demand.
Existing Capacity / Peak Day Demand = Existing Supply (in days)

In order to project the future storage requirements, expected operational demand growth can be applied to existing fuel flowage levels as outlined in **Table 5-19.**

TABLE 5-19 FUEL STORAGE REQUIREMENTS				
Year	**Peak Month Operations**	**Peak Month Demand (gallons)**	**Existing Capacity (gallons)**	**Existing Supply (days)**
Main Commercial Operations Fuel Farm				
2000 (Base Year)	6,133	4,293,100	1,260,000	8.8
2005	7,279	5,095,300	1,260,000	7.4
2010	8,571	5,999,700	1,260,000	6.3
2015	9,955	6,968,500	1,260,000	5.4
2020	11,406	7,984,200	1,260,000	4.7
GA/FBO Fuel Farm (Jet-A)				
2000 (Base Year)	2,285	285,625	60,000	6.3
2005	2,657	332,125	60,000	5.4
2010	3,034	379,250	60,000	4.8
2015	3,467	433,375	60,000	4.2
2020	3,923	490,375	60,000	3.7
GA/FBO Fuel Farm (100LL)				
2000 (Base Year)	2,285	22,850	12,000	15.8
2005	2,657	26,570	12,000	13.5
2010	3,034	30,340	12,000	11.8
2015	3,467	34,670	12,000	10.4
2020	3,923	39,230	12,000	9.2

Source: Birk Hillman Consultants Inc., 2001

As depicted in **Table 5-19** above, planning for the expansion of the fuel farm should commence as operations at the Airport are expected to increase significantly over the planning period. With the implementation of the midfield terminal, consideration should be given to allow for expansion of the current fuel farm, as the fuel will be pumped across the field via a hydrant fueling system to the new terminal. The current location of the fuel farm provides enough space for expansion and should be coordinated as deemed appropriate by the provider.

5.6.5 Air Traffic Control Tower

The current location and height of the air traffic control tower (ATCT) at RSW are sufficient for line of sight requirements for the existing runway. However, the height and location will not be sufficient for operations and safety when the midfield terminal is constructed and a new parallel runway is implemented. As such, the new tower location and height should be built to provide an unrestricted view of all operational aprons of the airfield. Based on FAA Order 6480.4 *Air Traffic Control Tower Siting Criteria*, a minimum visibility angle of 35 degrees relative to the runway grade should be provided to ensure the controller adequate depth perception. To determine approximate cab size, the control tower activity level must be determined. Using the methodology outlined in FAA Order 6480.7C, *Airport Traffic Control and Terminal Radar Approach Control Facility Design Guidelines*, it can be determined that the new RSW air traffic control tower would need to meet Level 3 tower requirements by 2020. The tower height will be analyzed as part of the alternatives chapter and will be primarily driven by its location and the need to provide a clear line of sight of the entire airport operations area.

5.7 CARGO FACILITY REQUIREMENTS

Air cargo at RSW is processed through two facilities. These facilities are the all-cargo building and the airline/belly-haul cargo facility.

The all-cargo building consists of approximately 24,000 ft^2 of warehouse, located west of the general aviation facility. A 69,000 yd^2 aircraft apron adjacent to the all cargo facility allows for the aircraft to park and load/unload air freight. The apron can accommodate six aircraft simultaneously depending on their size. The facility has direct access to Chamberlin Parkway and has adequate truck dock and automobile parking to satisfy the facility's needs. Three all-cargo carriers currently utilize the apron and building. They include FedEx, UPS and Airborne Express.

The belly haul cargo building consists of approximately 15,500 ft^2 of common use warehouse owned by the Lee County Port Authority and leased to the airlines and others for processing belly haul cargo. This facility is located to the west of the existing passenger terminal building and east of the all-cargo building. This facility has no dedicated aircraft parking apron. Cargo is tugged between the aircraft parked on the passenger terminal ramp and the belly haul facility via the airport perimeter road. The facility is accessible via Regional Lane, which connects directly to Chamberlin Parkway.

The projected growth of the all-cargo activity is expected to differ from the projected growth of the belly-haul cargo activity. Additionally, the space requirements for the two buildings are computed differently. These requirements are detailed in the following sections.

5.7.1 All-Cargo Activity Demand

The 1993 Master Plan indicated that there were only two all-cargo operators at RSW; they included Fed Ex and UPS. Combined, these two cargo carriers shared 40 percent of the overall cargo activity in 1993. Since then, Airborne Express, which operates as an all-cargo carrier, began serving RSW. Air cargo at the Airport has grown 4.4 percent annually over the past five years. Although no exact breakdown was available, it is believed that Airborne Express greatly contributed to the increase in the freight carried in all-cargo aircraft. In the year 2000, cargo carried by all-cargo aircraft contributed to 70 percent of the total cargo enplaned and deplaned at the airport. It is expected that the percentage of all-cargo activity will continue this increasing trend as a percentage of total cargo activity. The projected all-cargo demand is outlined in **Table 5-20**.

TABLE 5-20 ALL-CARGO ACTIVITY				
Year	**Total Cargo (lb)**	**Proportion of All-Cargo/Total Cargo**	**All-Cargo (lb)**	**All-Cargo (Tons)**
2000	34,482,000	70%	24,137,400	12,069
2005	40,297,100	75%	30,222,800	15,111
2010	46,993,300	75%	35,245,000	17,623
2020	61,536,900	80%	49,229,520	24,615

Source: Birk Hillman Consultants, Inc.

Based on the growth of cargo worldwide, the share of cargo carried by all-cargo aircraft at RSW is anticipated to increase to 75 percent by 2005 and then to 80 percent by the year 2020. By the end of the planning period it is projected that 49 million pounds (24,500 tons) of cargo will be transported on all-cargo aircraft.

5.7.2 All-Cargo Building Requirements

Depending on the efficiency of the processing systems utilized by the cargo operators, the building space needed to process one ton of freight per year typically varies between 1 and 2.5 square feet. One square foot per annual ton of freight indicates that a cargo operation is extremely efficient and advanced automation equipment is often used in processing the cargo. This is typical of airports with very high cargo volumes. A ratio closer to two and a half square feet per annual ton is representative of a facility that has little or no automation and processes cargo less efficiently. This is typical of a lower volume operation. RSW is not a hub for any of the all-cargo operators, and the overall cargo volume is relatively low compared to other airports of similar size. (The current ratio of space to freight is roughly 2 ft^2 per annual ton). However, the three cargo operators currently serving RSW have been in business for many years and have well established and efficient air cargo processing standards. Due to the fact that the existing facility has multiple tenants, no standard mechanical handling system, and some off-site processing associated with one of the cargo operators, 1.7 square feet of building space per one annual ton of cargo was used as a reasonable basis for developing future space requirements. It is anticipated that this ratio will drop as volume increases. **Table 5-21** outlines the space requirements for the all-cargo building and anticipated surplus or deficit for each of the planning periods.

TABLE 5-21 SPACE REQUIREMENTS FOR THE ALL-CARGO ACTIVITY					
Year	**Space Required/Annual Ton of Cargo (Ft2/Ton)**	**Annual Volume Of Cargo (Tons)**	**Space Required (Square Feet)**	**Existing Space (Square Feet)**	**Surplus/ Deficiency (Square Feet)**
2000	1.7	12,069	20,520	24,000	3,480
2005	1.7	15,111	25,689	24,000	(1,689)
2010	1.6	17,623	28,200	24,000	(4,200)
2020	1.5	24,615	36,925	24,000	(12,925)

Source: Birk Hillman Consultants, Inc. 2001

The space required per annual ton of cargo is anticipated to decrease slightly through the planning period due to improved efficiencies inherent with increased volumes of activity. Based on the continued use of the existing facility, a deficiency of 1,689 ft^2 is projected in the year 2005. This is expected to increase to 12,925 ft^2 by 2020.

5.7.3 All-Cargo Apron Requirements

The existing air cargo apron can accommodate up to six aircraft simultaneously with a balanced mix of narrow body aircraft (757 or smaller) and wide body aircraft (767 or smaller). In the year 2000, the Airport typically experienced one DC-9, one 727, and one 757 on the ramp simultaneously. It is anticipated that as the total cargo volume grows at the airport the aircraft size is likely to increase and/or the frequency of flights will have to increase to meet the demand. The forecasts for cargo operations during the peak month average day, project five to six aircraft by the end of the planning period. Even if all six aircraft arrived simultaneously, they could all be accommodated on the existing cargo apron, assuming the fleet mix of all-cargo aircraft serving RSW does not change dramatically. Although the projections do not warrant additional aircraft parking apron through the planning period, the alternatives chapter of this report will identify options for additional apron area if cargo grows beyond the total volume projections for the twenty-year time frame. Additionally, based on the condition of the cargo pavement, rehabilitation should be programmed in the short-term planning period.

5.7.4 Belly-Haul Cargo Demand

Belly-haul cargo remains an important profit generator for commercial airlines and is carried by a majority of the major passenger airlines to supplement passenger revenues. In the year 2000, belly haul cargo accounted for 10.0 million pounds of the 31.7 million pounds of total cargo processed through RSW. This equates to an approximate 30 percent share with all-cargo tonnage expected to increase throughout the planning period. It is estimated that the share of belly-haul cargo activity versus overall air cargo will decrease to 25 percent by 2005 and 20 percent by 2020. **Table 5-22** details the share of belly-haul cargo carried by aircraft passengers throughout the planning period.

TABLE 5-22
BELLY-HAUL CARGO ACTIVITY

Year	Total Cargo (lb)	Proportion of Belly-Haul Cargo/Total Cargo	Belly-Haul Cargo (lb)	Belly-Haul Cargo (Tons)
2000	34,482,000	30%	10,009,400	5,005
2005	40,297,100	25%	10,074,300	5,037
2010	46,993,300	25%	11,748,300	5,874
2020	61,536,900	20%	12,307,380	6,154

Source: Birk Hillman Consultants, Inc.

By the end of the planning period it is projected that 12.3 million pounds of cargo will be transported on commercial aircraft compared to 10 million pounds in the Year 2000

5.7.5 Belly-Haul Cargo Facility Requirements

The current ratio of belly-haul cargo space to annual ton of cargo is 3.1. This indicates that the existing facility is either not fully utilized or its configuration/allocation of space is inefficient. The utilization ratio of the existing building was reviewed along with a recent survey conducted to identify the space required for a relocated facility adjacent to the midfield terminal complex. The DMJM Aviation belly-cargo survey, conducted in July 2000, asked the airlines involved with belly-haul cargo activity at RSW how much they would need in the new freight forwarding facility. The results of the survey are presented in **Table 5-23**.

TABLE 5-23
2005 BELLY-CARGO SURVEY

Airline	Cargo Space Required		Space Requirements (ft^2)		
	Yes	***No***	***Warehouse***	***Office***	***Total SF***
Continental Airlines		No①			
Delta Airlines	Yes		5,000	1,000	6,000
Northwest Airlines	Yes		1,200	300	1,500
TWA②		No①			
United Airlines	Yes		1,200	300	1,500
US Airways	Yes		1,200	300	1,500
AMR		No			
Totals			**8,600**	**1,900**	**10,500**

Source: DMJM Aviation
① As of the Year 2001, Continental Airlines and TWA still operate their cargo facilities at RSW. However, their cargo services are slated to be discontinued during the short-term planning period.
② This survey was conducted before American Airlines acquired TWA. However, since no additional information was provided, it was assumed that nothing had changed.

Although the cargo survey outlines 10,500 ft^2 in identified space needs, a new midfield facility is planned for 15,000 ft^2 to provide for flexibility in accommodating tenants and potential air service expansion. A 15,000 ft facility would provide a space to process a ratio of 2.6 ft^2 per annual ton in 2010 and 2.4 ft^2 per annual ton in 2020. As such, it is anticipated no expansion will likely be required to this facility through the end of the planning period. However, for long term planning purposes, it is recommended that land be set aside to provide for at least a 50 percent expansion of the pending belly-haul facility.

5.8 GENERAL AVIATION FACILITY REQUIREMENTS

The existing general aviation (GA) facility is located west of the existing passenger terminal and includes a general aviation terminal building, aircraft parking apron and a single multi-use hangar. The terminal is a two-story building with approximately 8,000 square feet of space, the aircraft parking apron is approximately 39,000 square yards and the multi-use hangar totals approximately 26,200 square feet. Construction has begun on a second GA facility located west of the existing GA facility. The new facility will include a new general aviation terminal building with approximately 51,500 square feet of space, and approximately 23,000 square yards of new aircraft apron. This new facility has the potential to expand in the future with an additional

39,950 square feet of building and another 17,940 square yards of aircraft parking apron. Private Sky is the new tenant and currently the only general aviation operator at RSW. They plan to use the existing apron and hangar facilities but plans for the reuse of the old GA terminal building were not known at the time of this analysis.

For planning purposes and determining the future requirements for general aviation aircraft, based and itinerant aircraft were analyzed separately since they serve different traffic segments and have different space requirements. The projected demand, hangar and apron parking requirements for each are detailed in the following sections.

5.8.1 Based Aircraft Demand

The number of based aircraft varied from 1 to 8 between 1995 and 2000. This number is expected to grow to 28 based aircraft by 2020, as projected in the Forecast Chapter. In order to determine the future requirements for based aircraft, the split of single-engine, multi-engine and jet aircraft was estimated. In doing so, the same percentages splits used in projecting the general aviation operations were applied. The results are outlined in **Table 5-24**.

TABLE 5-24
TYPES OF BASED AIRCRAFT

Year	Single-Engine Aircraft	Multi-Engine Aircraft	Jets	Total Number
2000	1	5	2	**8**
2005	1	8	4	**13**
2010	2	10	6	**18**
2020	3	16	9	**28**

Source: Birk Hillman Consultants, Inc. 2001.
Ricondo and Associates, Inc 2001.

It is worth noting that the calculations were rounded up in order to favor larger aircraft, especially jets, since the apron and hangar requirements for jet aircraft are slightly larger.

5.8.2 Based Aircraft Hangar Requirements

Southwest Florida is known for intense sunlight, heavy rains, occasional hail and strong winds, especially during the summer months. As such, aircraft owners often desire to store their aircraft in hangars year around, if possible. The Lee County Port Authority is currently experiencing a demand for hangars at Page Field General Aviation Airport that far exceeds capacity. While Page Field currently provides hangars for 30 percent of its based aircraft, it is expected to increase to 60 percent by 2020. This is in line with levels already provided by other airports in the region. It is expected that storage requirements will be similar at RSW, particularly in light of the number of high end turbo prop and GA jet aircraft either currently utilizing or projected to utilize the facility. **Table 5-25** outlines the anticipated based aircraft demand throughout the planning period.

TABLE 5-25 BASED AIRCRAFT: PERCENT OF HANGARED AIRCRAFT			
Year	**Total Number of Based Aircraft**	**Hangared Based Aircraft/ Total Based Aircraft**	**Hangared Aircraft Demand**
2000	8	40%	3
2005	13	40 %	5
2010	18	50 %	9
2020	28	60 %	17

Source: Birk Hillman Consultants, Inc. 2001.

In the year 2000, roughly 40 percent of the aircraft based at RSW were stored in the 26,000 square foot hangar located east of the existing GA terminal. The 26,000 square foot hangar has the capability to store six to seven aircraft simultaneously depending upon their size. It should be noted that Private Sky has started to provide maintenance services in the existing hangar. As such, the hangar is now used for both maintenance and storage of general aviation aircraft with half of the hangar space set aside for each.

In order to relate aircraft hangar demand into the hangar space required, the demand must be split into aircraft types. In reviewing, the projected based aircraft fleet at RSW, it is likely that a large number of jets based at RSW will choose to be stored in hangar facilities. The expense of these aircraft coupled with the extreme cost of repairs and maintenance tends to support this assumption. The remaining hangar space is anticipated to be occupied by multi-engine and single-engine aircraft. Based on the projection of larger corporate jets and multi engine aircraft based at RSW and the assumption that the majority of these will be stored in hangars, an average of 3,000 square feet per hangared aircraft was used to determine hangar space. The projected mix of aircraft and hangar storage requirements are included in **Table 5-26**.

TABLE 5-26 BASED AIRCRAFT: HANGAR REQUIREMENTS					
Year	**Single-Engine Aircraft**	**Multi-Engine Aircraft**	**Jets**	**Total Number of Hangared Positions**	**Hangar Space Required (S.F)**
2000	0	2	1	3	9,000
2005	0	2	3	5	15,000
2010	1	3	5	9	27,000
2020	1	8	8	17	51,000

Source: Birk Hillman Consultants, Inc. 2001

Since the number of hangared positions and the type of activity do not justify the construction of T-hangars but favor bulk hangars and/or multi-use hangars, it is recommended that the requirements for based and itinerant aircraft be combined for accommodation in the same hangars.

5.8.3 Based Aircraft Parking Apron Requirements

Based on the anticipated number and fleet of aircraft to be hangared, the number of aircraft remaining on the apron and the associated area required can be estimated. The analysis outlined in **Table 5-27** assumes that single-engine and multi-engine aircraft each need about 800 square yards per parking position and that jet aircraft will need approximately 1,200 square yards.

TABLE 5-27
BASED AIRCRAFT: FLEET MIX OF NON-HANGARED

Year	Single-Engine Aircraft	Multi-Engine Aircraft	Jets	Total Number of Non-Hangared Positions	Total Based Aircraft Apron Area (Square Yards)
2000	1	3	1	5	4,400
2005	1	6	1	8	6,800
2010	1	7	1	9	7,600
2020	2	8	1	11	9,200

Source: Birk Hillman Consultants, Inc. 2001

5.8.4 Itinerant Aircraft Demand

Itinerant general aviation demand is often difficult to project. This is particularly true relative to the number of aircraft that will be parked on the apron at the same time. The FAA provides guidelines in Advisory Circular AC150/5300-13, Annex 5, Change 6, "Small Airport Buildings, Airplane Parking, and Tie-Downs" to calculate the number of itinerant aircraft utilizing the apron simultaneously. The steps to determine the itinerant parking demands at RSW followed the guidelines in the advisory circular and are outlined as follows:

1. Consider the total annual operations (as forecasted)
2. Consider the total operations of the peak month (11.4% of the year from forecasts)
3. Consider the operations of an average day of the peak month (divide by 31)
4. Assume the busy day is 10 percent more than the average day
5. Divide by two to obtain the total number of aircraft per day
6. Assume that 60 percent of the transient aircraft will be on the apron at the same time.

The results of the above calculations are presented in **Table 5-28** and are estimated for the busy day of the peak month for the years 2005, 2010 and 2020.

TABLE 5-28
PEAK ITINERANT AIRCRAFT DEMAND

Year	Annual Operations	Peak Month Operations	Average Day Operations	Busy Day Operations	Busy Day Aircraft	Aircraft at the FBO, at the same time
2000	16,816	1,917	62	68	34	**21**
2005	19,237	2,193	71	78	39	**24**
2010	21,803	2,404	78	86	43	**26**
2020	27,520	3,137	101	111	56	**34**

Sources: Ricondo & Associates, Inc.
Birk Hillman Consultants, Inc. 2001

5.8.5 Itinerant Hangar Requirements

Providing adequate hangar facilities for itinerant aircraft requires consideration of a number of factors. Some itinerant aircraft will only stay a couple of hours while others may stay for a couple of days to over a week. GA jets and high end turboprop aircraft are typically primary itinerants that want single or multiple overnight temporary storage. The percentage of itinerant aircraft owners willing to hangar their aircraft is projected to increase throughout the planning period due to some of the same reasons mentioned for the hangaring of the based aircraft. Since no information was available from the former FBO operator regarding the number of itinerant aircraft desiring hangars, estimates were used to project the numbered hangar spaces required. In the year 2000, it was estimated that ten percent of the aircraft at the FBO at the same time would want hangar facilities to store their aircraft. By 2020, it was projected that twenty percent of the itinerant aircraft would desire aircraft storage. **Table 5-29** depicts the projected number of itinerant aircraft demanding hangars and the associated area requirement

Table 5-29
ITINERANT AIRCRAFT IN HANGARS

Year	Total Number of Aircraft at the FBO	% of Aircraft in Hangars	Number of Aircraft in Hangars	Hangar Space Required (Ft²)
2000	21	10%	2	7,000
2005	24	10%	3	10,500
2010	26	15%	4	14,000
2020	34	20%	7	24,500

Source: Birk Hillman Consultants, Inc. 2001

In order to provide maximum flexibility in the storage of aircraft, it was assumed that the majority of aircraft to be hangared would be the larger aircraft, such as the medium to larger size general aviation jets and multi engine aircraft. Utilizing the larger jets as the criteria for determining hangar space requirements would leave ample space to provide for the smaller jets and multi-engine turbo prop aircraft in hangars as well. To estimate the demand for itinerant aircraft hangar space 3,500 square feet per itinerant aircraft was used. This is 500 square feet larger than what was used to project based aircraft hangar requirements due to the necessity for accommodating the larger itinerant aircraft and also to provide additional flexibility in the movement of aircraft into and out of the hangars.

5.8.6 Itinerant Apron Requirements

For planning purposes apron parking requirements for itinerant aircraft tend to be larger than those for based aircraft. An average of 1,500 square yards per peak itinerant aircraft was used to determine the future apron requirements for itinerant aircraft. This figure takes into account the required wingtip clearances and taxilane/maneuvering area in front of the tie-down position. The total apron required to provide for itinerant aircraft is outlined in **Table 5-30.**

TABLE 5-30 APRON AREA FOR ITINERANT AIRCRAFT		
Year	**Number of Parking Positions**	**Area Needed (Sq. Yards)**
2000	19	28,500
2005	21	31,500
2010	22	33,000
2020	27	40,500

Source: Birk Hillman Consultants, Inc. 2001

5.8.7 Total GA Hangar and Apron Requirements

The goal of the two previous sections was to determine how much hangar and apron area will be required to accommodate the growth of each segment of projected general aviation activity. This section outlines the combined requirements for both based and itinerant aircraft and compares this to current conditions.

Table 5-31 provides a summary of the combined hangar requirements for based and itinerant aircraft as well as the projected deficiency or surplus for the development period.

TABLE 5-31 SUMMARY OF GA HANGAR REQUIREMENTS								
Year	**Based Aircraft**		**Itinerant Aircraft**		**Total Required**		**Existing Hangar Space**	**Hangar Space Deficient/Surplus**
	# of Aircraft	***Square Feet***	***# of Aircraft***	***Square Feet***	***# of Aircraft***	***Square Feet***	***Square Feet****	***Square Feet***
2000	3	9,000	2	7,000	5	16,000	13,000	(3,000)
2005	5	15,000	3	10,500	8	25,500	6,500	(12,500)
2010	9	27,000	4	14,000	13	41,000	0	(41,000)
2020	17	51,000	7	24,500	24	75,500	0	(75,500)

Source: Birk Hillman Consultants, Inc. 2001
* *Existing available hangar space is decreased due to increasing aircraft maintenance demand.*

The above analysis assumes that the existing 26,000 square-foot facility hangar would transition to aircraft maintenance exclusively by 2010. Based on this assumption, it is estimated that a 3,000-square foot deficiency in hangar storage space currently exists. This shortfall is projected to increase to 75,500 square feet by the year 2020. Thus, it is recommended that space be set aside to accommodate an additional 75,500 square feet of bulk or multi-use aircraft hangars in support of GA activity.

In determining the total GA apron area deficiency or surplus, the new apron project (approximately 23,000 square yards) associated with the new general aviation terminal facility was included in the existing apron figure. **Table 5-32** outlines the GA apron requirements.

TABLE 5-32 TOTAL GA APRON AREA REQUIREMENTS (Square Yards)					
Year	**Based Aircraft**	**Itinerant Aircraft**	**Total**	**Existing**	**Deficient/Surplus**
2000	4,400	28,500	32,900	48,650	15,750
2005	6,800	31,500	38,300	48,650	10,350
2010	7,600	33,000	40,600	48,650	8,050
2020	9,200	40,500	49,700	48,650	(1,050)

Source: Birk Hillman Consultants, Inc.

With the new 23,000 square yard apron project, projected demand for both based and itinerant aircraft parking positions are met through the 2010 planning period. By 2020, a 1,050-square yard projected shortfall of parking apron is anticipated. However, it is important to note that if the indicated hangar shortfalls are not provided for, the apron parking requirements will increase considerably.

5.9 NON-AVIATION SUPPORT FACILITIES

5.9.1 Multi-modal Facilities

A "multi-modal" facility is a facility(s) that provides an interface between multiple transportation types. These types may include air, roadways, rail, or sea and may be oriented to either the movement of freight, passengers, or both. As airports typically are provided with good surface access and provide air access by function, they also may offer a cost effective and efficient location for consolidation of other transportation facilities. In reviewing the potential need to provide for multi-modal facilities at RSW, a number of observations were made. However, as multi-modal access is a very complex issue requiring detailed analyses of numerous regional factors, it is recommended that a detailed multi-modal study be undertaken to confirm the need for and ultimate approach to multi-modal provisions.

Freight

Trucks are the dominant mode of transportation for businesses shipping goods into and out of the Southwest Florida region. As depicted in a business transportation survey conducted in the 2000 "Transportation Cornerstone, Southwest Florida" report by the Florida Chamber Foundation, trucking in southwest Florida, on average, accounted for about 88 percent of the total shipments. Rail, air, and ship all require the use of trucking in one stage of the trip. Due to the limited rail availability in the region, the use of trucks for transporting goods remains the key mode for Southwest Florida transportation logistics. As RSW forecasts indicate an increase in cargo operations and overall economic growth in the region, the potential need for freight warehousing, surface freight terminals, and other such consolidation facilities at the Airport should be considered.

The Seminole Gulf Rail provides the primary heavy rail freight service to the region connecting Vanderbilt Beach to the south with Arcadia to the north. The connection to CSX Rail Line in Arcadia provides access to the national rail system.

As noted in the before mentioned transportation survey, 25 percent of the businesses surveyed viewed rail as "highly important" or "essential" to their operations. However, a definite improvement in rail transportation was also envisaged as only 12 percent of the businesses that completed the survey rated the rail transportation mode as "adequate" or "very adequate". The Florida Chamber Foundation report also noted that the lack of inter-modal access to the Southwest Florida area prevents the businesses from more easily transporting their goods by rail and contributes to a greater dependence on trucks. This dependence on trucks is also responsible for the traffic congestion experienced on the major arterial roads in the area such as I-75 and U.S. 41. This is especially evident in the RSW area and at the Daniels Parkway I-75 interchange. With the potential for light industrial development on the airport and the airport's status as a Foreign Trade Zone, it appears that some type of heavy rail access should be considered between the airport and the Seminole Gulf Rail Line.

It has been noted that an easement did exist along the north side of Alico Road which provided a right of way for the Seminole Gulf Rail Company. Based on discussions with the local planning agencies the easement has been abandoned and no longer exists. Although rail is not a predominant mode of transporting passenger or freight in Southwest Florida, a link to the airport should be considered as part of an ultimate development plan. It is recommended that land be reserved for a passenger and freight multimodal link at the airport.

Passengers

Passenger transportation requires consideration of a range of other potential facilities. Options for rail can include heavy rail (AMTRAK), highspeed rail and light rail. Bus service includes local, long distance and prearranged charter. Surface transportation can include car pool or commuter facilities.

Southwest Florida currently has no direct regional passenger rail service of any kind. While Amtrak has a station in Fort Myers, all passengers are currently bused in from either Tampa or Orlando. It is unclear what demand levels would be required to justify extension of heavy rail passenger service to Fort Myers or whether in fact, the existing lines have the capacity to support such activity. While highspeed rail is being considered between major metropolitan areas in Florida, extension of this system to Fort Myers is not even in the preliminary planning stages. Additionally, given the existing and projected population base, such a system would not likely be considered economically feasible until well beyond the planning period. Again, given the regional population base and density, light rail will also not likely be feasible until well beyond the planning period.

Automobiles and buses appear to be the likely modes of passenger transport for the region for the forseeable future. The proximity of the Airport to I-75 would likeley result in good point-to-point bus service, but its distance from the major metropolitan areas would not likely make it a good location for a regional bus terminal.

5.9.2 Hotel

In considering potential sources of revenue enhancement for RSW, provision for development of an on airport hotel should be considered. While business oriented airport hotels are often located within the terminal area of an airport, the profile of activity at RSW requires consideration of a site outside the terminal area that would benefit from use by both airport users and I-75 automobile traffic. Such a site would provide the greatest potential return to a hotel operator and provide the greatest potential for a successful operation. The size of the site should be adequate to support a 300 room hotel with ample space for meeting rooms.

5.9.3 Commercial/Industrial Areas

The expansion of commercial/industrial facilities and land use areas at RSW are important to the overall development of the Airport and its financial stability. The leasing of land for such facilities would provide the Airport with additional funds needed for continuous airport improvements. The demand for a suitable industrial area in close proximity of the Airport comes from the fact that the areas surrounding the Airport are growing rapidly in terms of commercial business, which is mostly based on tourism. The Airport is close to the main tourist and other industrial areas of Fort Myers and hence a commercial/industrial complex location at the Airport would provide an excellent distribution point for the continuation of export or import goods. Based on this, land should be identified with the ability to provide for such developments in enhancing the Airport's revenue system. Provisions should also be made to provide for basic infrastructure required to develop the identified sites.

5.9.4 Land Acquisition

Land Acquisition for I-75 Airport Access

The current plan to improve vehicle traffic to and from the Airport is to provide direct access to I-75 between Alico Road and Daniels Parkway. Along with the proposed plan to widen I-75 in 2008, this improvement plan will relieve the traffic congestion currently experienced on I-75. RSW is the only major commercial airport located in Florida without direct access to the Intrastate Highway System. The acquisition of land of approximately 460 +/- acres between Treeline Avenue /Ben Hill Griffin Parkway and I-75 has been identified for acquisition to provide a corridor to I-75. It is recommended that the LCPA pursue this acquisition aggressively due to intense development pressures in this region. The Airport Access section will provide additional discussion on this topic.

Land Acquisition for Area East of the New Parallel Runway

The acquisition of this land has been identified for the purpose of providing the operational safety required for the Runway Protection Zone (RPZ) and approach surface to the new runway. It is recommended this area be acquired to avoid future conflicts regarding the new parallel runway and to allow for the airport to control the lands in the RPZ. The approximate area recommended for acquisition is 139 acres. It is also recommended that land within the "Timber Trails" subdivision be acquired to help eliminate incompatible land uses. Voluntary acquisition of lots within the Timber Trails subdivision (f/k/a Piney Acres) as shown in the land acquisition map is recommended to protect the airport from incompatible land use. This subdivision is located at the east end of Runway 6/24 within the flight path. Due to its close proximity to the airport, the Timber Trails subdivision is included within Zone 3 of the noise zone overlay mapping. It is therefore within a zone that restricts development to no noise sensitive uses and prohibits the construction of single family homes. Since Timber Trails was platted prior to the establishment of the noise zones, the subdivision is vested and single family homes are allowed if certain requirements are met. This determination was made in a memo from the Lee County Attorney's Office in July 1998. One of the requirements was the submittal of an avigation easement prior to the issuance of a building permit. The purpose of an avigation easement is to provide a legal basis for acknowledging the presence of noise impacts. Since the time of the determination, the Lee County Attorney's Office has removed the avigation easement requirement. Therefore, any protection granted to the Port Authority and/or notification to the property owner through the avigation easement process as been removed. The Port Authority initiated a voluntary land acquisition program within the southern portion of the Timber Trails subdivision as part of the 1992 Master Plan. Of the ninety-four (94) Timber Trails lots within the 1992 proposed acquisition boundary, seventy-seven (77) were purchased and seventeen (17) continue under private ownership. The majority of these lots are vacant land. Given this, it is recommended that the Port Authority complete the acquisition, on a voluntary basis, within the initial boundary.

Land Acquisition for Area West of the New Parallel Runway

Based on the noise contours approximately 88 acres of land south of the airport between the Ben Hill Griffin Parkway extension and Airport Haul road may need to be acquired to avoid potential noise problems. This land acquisition recommendation is due to aircraft noise. A discussion of noise and the effects on adjacent land uses is discussed further in Chapter 7, "Environmental Overview".

5.9.5 Storm Water Requirements

During the original construction of the airport, the storm water management system was permitted through the South Florida Water Management District (SFWMD). Subsequent development at the airport has been handled on airport through a number of detention/retention areas scattered throughout the Airport rather than a consolidated means of handling storm water. It is highly recommended that RSW implement a comprehensive storm water plan for all areas at the Airport to allow the most efficient development approach in consideration of the airport's large areas of wetland and environmentally sensitive land. Such a plan would allow the Lee County Port Authority to more efficiently plan building sites and determine land-use compatibility. All storm water improvements at the airport should strive to comply with the guidelines set forth in FAA Advisory Circular 150/5200-33, "Hazardous Wildlife Attractants on or Near Airports."

5.9.6 Mitigation

The land surrounding the existing airport facilities includes numerous wetlands and environmentally sensitive lands. To provide for major developments such as a new midfield terminal complex, off-site land areas have been purchased to allow for the mitigation of any associated impacts. Chapter 7, the Environmental Overview outlines the mitigation strategy for RSW and the details of mitigation lands required for future development will likely be incorporated in the ongoing Environmental Assessment.

Projects with mitigation implications that are currently programmed include:

- Fill Habitat Areas and Unimproved Ponds (Midfield Program)
- Removal of Unsuccessful Mitigation Area "G"
- Mitigation Management

5.9.7 Rehabilitate All Service Roads

To increase safety and efficiency of service road operations at the Airport, it is recommended that a plan be implemented to rehabilitate all service roads.

5.9.8 Flight Kitchen

Per discussions with the operators of the flight kitchen at RSW, no additional areas are anticipated for catering facilities due to the general trend of a reduction of in-flight meals being served on flights operating at the Airport.

5.9.9 Security Fencing/Access

Since a number of major new airport developments have been planned, the replacement, upgrade and reorientation of security fencing will be required in related areas of the Airport. Additional checkpoints should also be considered as appropriate to provide controlled access to airside facilities.

5.9.10 Landscaping

Landscaping is important to the image and attractiveness of an Airport. This is important not only for the tourist associated areas but also to enhance the facility's overall interface with the community. It is therefore recommended that an ongoing capital program be established with adequate budget for the continual improvement of these areas.

5.10 AIRPORT ACCESS

The Southwest Florida International Airport (RSW) is located ten miles southwest of the City of Fort Myers, Florida as shown in the General Location Map, **Exhibit 5-1**. The Airport opened in 1977 and has undergone significant expansion to meet the air service needs of Southwest Florida. As a part of this continued expansion, a new midfield terminal is currently under construction. Access to the existing terminal area and the new midfield terminal complex will be discussed in this narrative.

5.10.1 Existing Terminal Facility

Access to the Airport Terminal area is currently provided by two roads on Airport property, Chamberlin Parkway (located at the northwest corner of the Airport) and Paul J. Doherty Parkway (located at the northeast corner of the Airport) as shown on **Exhibit 5-2**. They both are four-lane divided roadways, which connect to off-site Daniels Parkway. Daniels Parkway (six lane divided, SR 876) runs in an east-west direction and provides access to Interstate 75 to the west of the airport. Daniels also provides access to I-75 from the communities of Lehigh Acres, Gateway and to the northeast Airport service area.

5.10.2 The New Midfield Terminal Complex

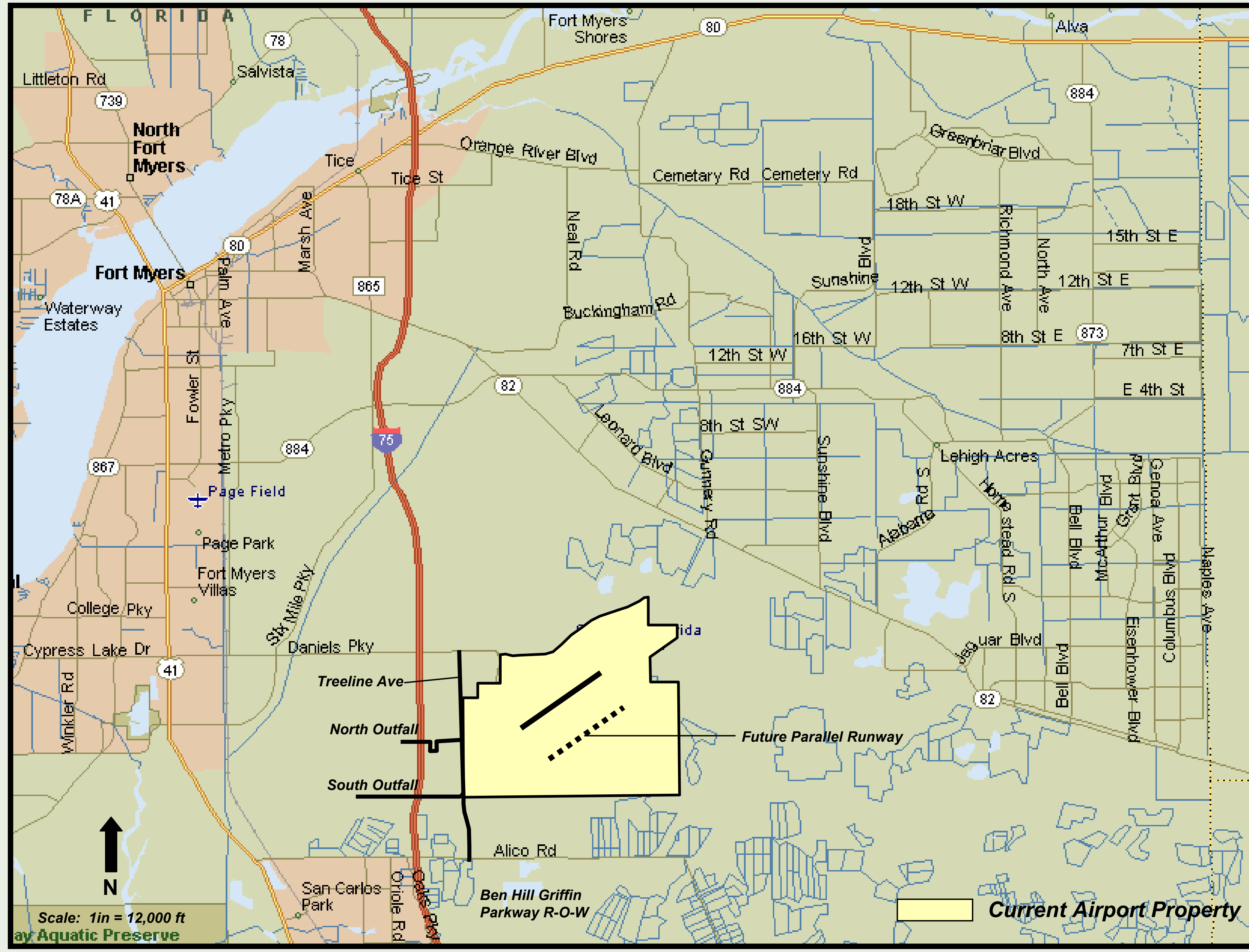
The new midfield terminal complex, is proposed to open during the first quarter of 2005 and will replace the existing passenger terminal facility. With the proposed opening of the Midfield Terminal, several access roadway systems will be constructed to serve the new facility. These new roadways, shown in **Exhibit 5-3**, include the construction of Treeline Avenue (TA) from its current intersection with Daniels Parkway (SR 876) south to the new airport terminal access roadway system. The roadway's name will change to Ben Hill Griffin Parkway (BHGP) (at its intersection with the Airport Passenger Terminal Access Road) and will continue in a southerly direction to its intersection with Alico Road.

Exhibit 5-1

Vicinity Map

SOUTHWEST FLORIDA INTERNATIONAL AIRPORT

LOCATION WITHIN FLORIDA



Source: Microsoft Expedia Streets, 2001 and Reynolds, Smith and Hills Analysis, 2002

Lee County Port Authority	Birk Hillman (Orlando · Miami · Atlanta)	DMJM Aviation	RS&H	SOUTHWEST FLORIDA INTERNATIONAL AIRPORT FORT MYERS, FLORIDA MASTER PLAN UPDATE VICINITY MAP	EXHIBIT 5-1

Exhibit 5-2

Existing Roadway Access

Lee County Port Authority

Birk Hillman
Orlando · Miami · Atlanta

DMJM Aviation

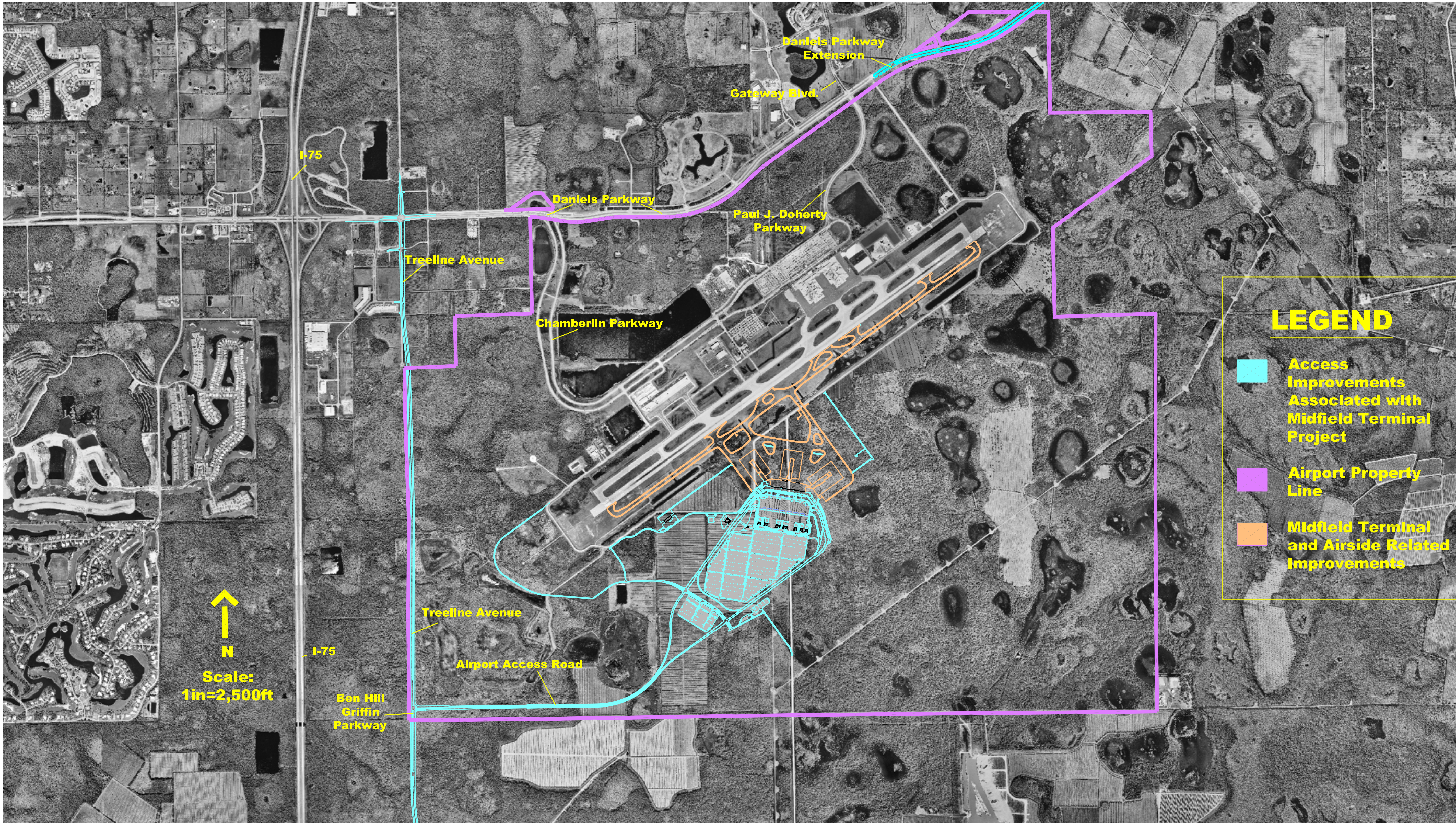
RS&H

SOUTHWEST FLORIDA INTERNATIONAL AIRPORT
FORT MYERS, FLORIDA
MASTER PLAN UPDATE
EXISTING ROADWAY ACCESS

EXHIBIT
5-2

Exhibit 5-3

Midfield Roadway System



Source: Reynolds, Smith and Hills, Inc., 2002

Lee County Port Authority | Birk Hillman Orlando · Miami · Atlanta | DMJM Aviation | RS&H

SOUTHWEST FLORIDA INTERNATIONAL AIRPORT
FORT MYERS, FLORIDA
MASTER PLAN UPDATE
FUTURE AND EXISTING ROADWAY ACCESS

EXHIBIT
5-3

TA/BHGP will be constructed as a divided four-lane controlled access roadway with future expansion potential to 6 lanes. Access to TA/BHGP has been restricted by the Lee County Board of County Commissioners in order to minimize signalization and disruption of flow along this roadway. The TA and Daniels Parkway intersection will be configured so that there will be three left turn lanes heading toward I-75 to enhance the flow from the Airport to I-75. The intersection at BHGP and Alico Road will provide for two right turn lanes in order to facilitate traffic movement from the Airport to I-75 traveling in a southerly direction. The proposed speed limit along TA/BHGP will be posted at 45 MPH.

Passenger and employee access to the new Midfield Terminal Complex, shown on **Exhibit 5-3** will be via a four-lane divided access roadway system from TA and BHGP. The roadway system loops in front of the passenger terminal providing direct access and parking. The terminal roadway system will be designed to direct departing traffic to the upper level and to direct arriving traffic to the lower level to enhance traffic flow and improve curbside capacity and function. Surface and structural garage parking will also be provided to service the passenger terminal.

5.10.3 Need for Improved Airport Access

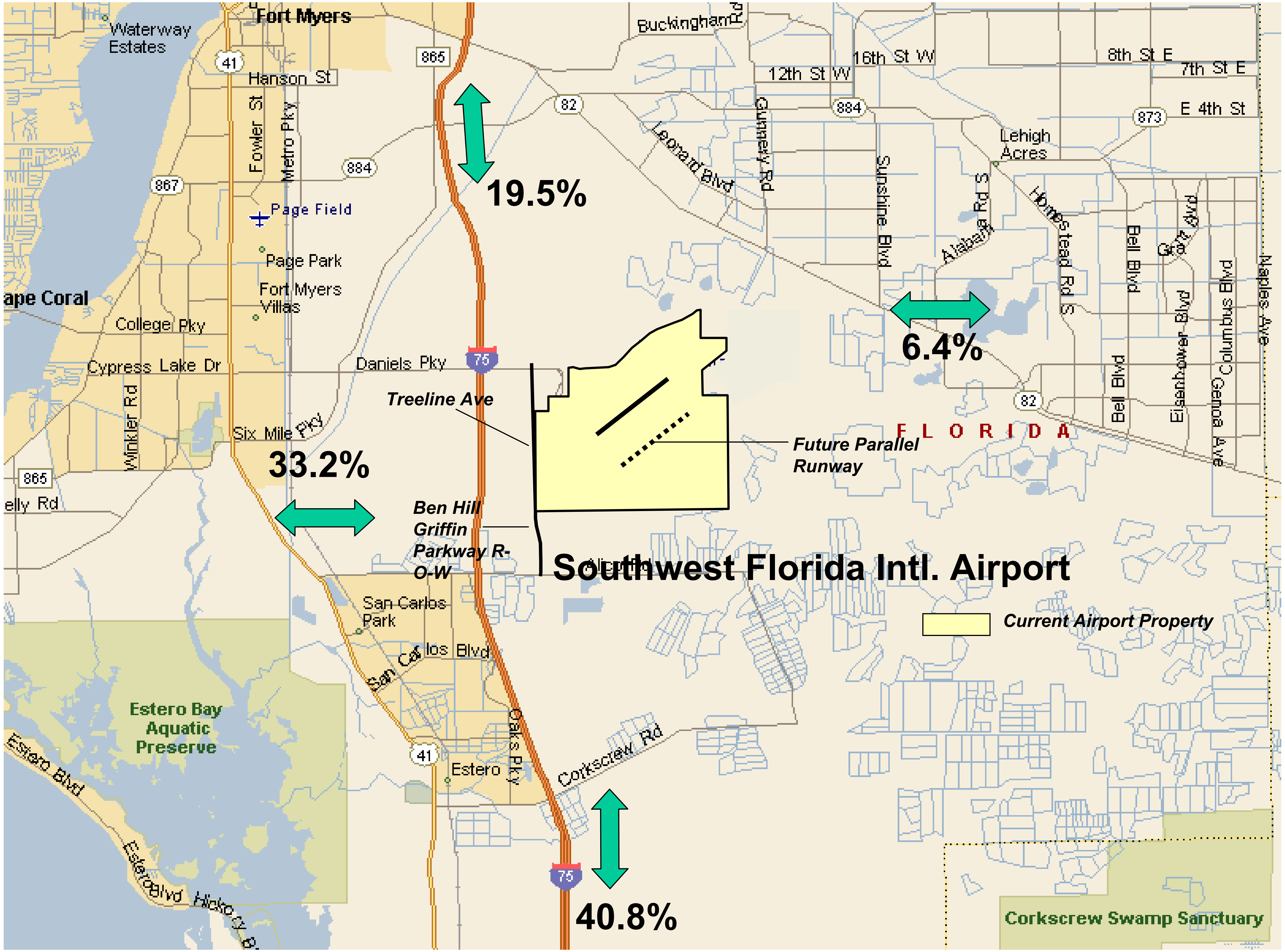
In order to provide for the air transportation needs of the community, the Airport is carrying out several major expansions to the existing airport; a new midfield passenger terminal complex, planned new parallel runway, planned future terminal expansion and associated access roadways. To be able to best provide for these increased access needs, it is necessary to understand the airport service area, current and future passenger volumes and associated access routes. These passenger characteristics were recommended in an origin and destination survey.

In 1998, the Lee County Port Authority conducted an origin and destination survey to determine passenger travel patterns to and from the Airport. The following sketch illustrates the direction of travel to the Airport. It was found that 75% of the passenger traffic was from the south and west of the Airport, and about 25% was coming from the north and east of the facility as shown in **Exhibit 5-4**.

Current and Previous Studies

Roadway access to the Airport has been studied in numerous documents due to the Airport's crucial role in providing access to southwest Florida. This section will provide a brief summary of some of the studies that reference access to the airport.

Exhibit 5-4
Origin and Destination Survey



N

Not To Scale

Source: Lee County Port Authority Origin and Destination Survey, 2002

SOUTHWEST FLORIDA INTERNATIONAL AIRPORT
FORT MYERS, FLORIDA
MASTER PLAN UPDATE
ORIGIN AND DESTINATION SURVEY

EXHIBIT
5-4

Lee County Metropolitan Planning Organization - 2020 Long Range Transportation Plan

Lee County adopted the 2020 Long-Range Plan in December 2000. The purpose of the Lee County (MPO) 2020 Long-Range Transportation Plan (LRTP) is to develop a process and plan to address the future transportation and intermodal needs of the greater metropolitan area. This plan coordinates and guides implementation of transportation capital improvement programs with the Florida Department of Transportation (FDOT) and local and regional agencies. Additionally, the plan is developed to meet the criteria of the Federal Transportation Equity Act of the 21st Century (TEA 21) which requires a fully integrated intermodal transportation system.

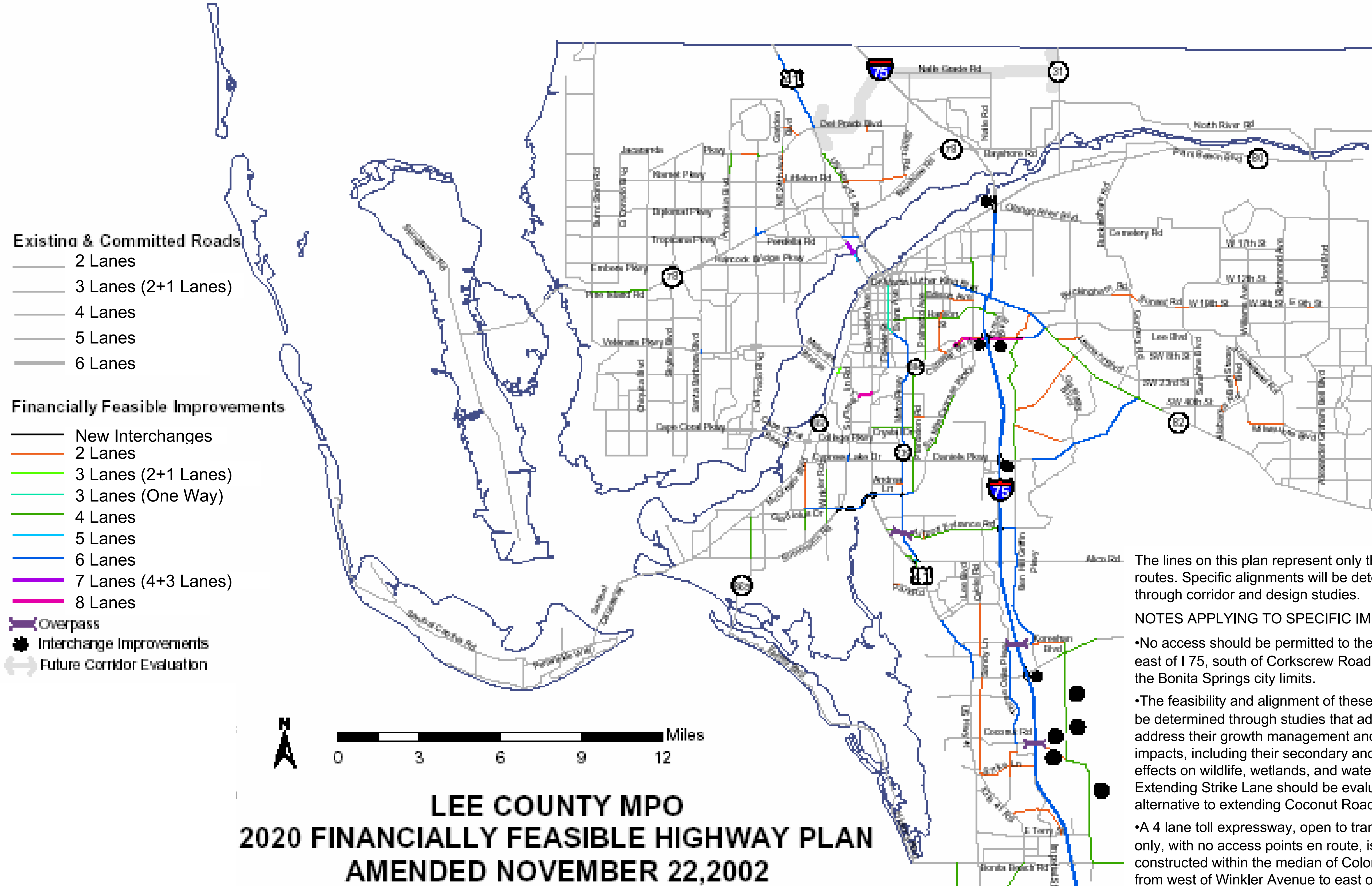
Multimodal transportation involves the moving of passengers or freight between points of origin and destination using two or more modes. For freight transport, that means an exchange of freight between air to truck for delivery. For air passengers, that means the exchange between the aircraft and the surface transportation mode, which is typically, an automobile. The three elements of the intermodal transfer process are (1) the landside portion including the highway network, (2) the intermodal transfer facility, and (3) the airside portion of the airport including the runway environment and airway system. This overview will provide a brief description of the highway system as an integral part of this intermodal network.

To provide a "seamless" transportation connection between modes, the three elements mentioned above must work in harmony. Each element must be able to cope with travel demands to provide a high quality of service.

Roadway improvements identified in the 2020 Long Range Cost Feasible Highway Plan are shown in **Exhibit 5-5**. Improvements associated with the Airport referenced in the document include direct access to Interstate 75.

Exhibit 5-5

MPO 2020 Financial Feasible Map



The lines on this plan represent only the general routes. Specific alignments will be determined through corridor and design studies.

NOTES APPLYING TO SPECIFIC IMPROVEMENTS

•No access should be permitted to these roads east of I 75, south of Corkscrew Road, and north of the Bonita Springs city limits.

•The feasibility and alignment of these roads should be determined through studies that adequately address their growth management and environmental impacts, including their secondary and cumulative effects on wildlife, wetlands, and water management. Extending Strike Lane should be evaluated as an alternative to extending Coconut Road east of I 75.

•A 4 lane toll expressway, open to transponder users only, with no access points en route, is to be constructed within the median of Colonial Boulevard from west of Winkler Avenue to east of Treeline Avenue.

LEE COUNTY MPO
2020 FINANCIALLY FEASIBLE HIGHWAY PLAN
AMENDED NOVEMBER 22,2002

Source: Lee County 2020 Transportation Plan, 2002

Transportation Cornerstone Southwest Florida – Florida Chamber of Commerce Foundation

This 2000 study was initiated by the Florida Chamber to evaluate and address the transportation needs of Southwest Florida and identified the lack of direct Airport access to an Interstate Highway System. The study indicated that RSW is the primary gateway to the region. While expansion of the passenger terminal facility with the new midfield terminal will help the airport keep up with projected passenger demand, surface access is of particular concern. The study recommended that the Lee County Port Authority (LCPA) work cooperatively with FDOT, MPO governing boards and local governments to address a long-term solution for surface access to the facility.

I-75 PD&E Study

The Florida Department of Transportation (FDOT) has funded a Project Development and Environmental (PD&E) Study for the I-75 Corridor in Lee and Collier Counties. The completion date of the study is anticipated to be early Spring 2003. The limit of the study is from SR 951(Collier Boulevard) to SR78 (Bayshore Road). The purpose of this study is to develop strategies to mitigate I-75 congestion through the year 2030. The study will recommend the widening of I-75 from the current 4 lanes to as many as 10 lanes (6 local lanes, 4 special-use/express lanes to accommodate future traffic demand in Southwest Florida). As part of the PD&E study, Airport access was also evaluated and the recommended alternative will be presented later in this section.

I-75 Interchange Planning Study

A System Interchange Modification Report (SIMR), by the Federal Highway Administration (FHWA) approved in September 2002, was prepared to address the projected traffic volume, access and operational needs of the interrelated interchanges along I-75 including Alico Road and Daniels Parkway interchanges. This report also recommends improvements to provide enhanced access to the Airport.

5.10.4 Airport Master Plan Update/Lee Plan Coordination

As part of the Airport Master Plan Update process, the Airport will submit a Lee Plan Amendment for approval by Lee County, Southwest Florida Regional Planning Council, and the Florida Department of Community Affairs. This document will serve to ensure that the airport master plan and future local, regional and state planning efforts are compatible and consistent.

A number of traffic studies have been completed in the past to review traffic around RSW. These include:

- 1976/77 DRI Application for Development Approval
- 1988/89 Daniels Parkway Widening and Extension Engineering Report prepared by Johnson Engineering
- Southwest Florida Regional Airport Travel Patterns (O-D Study dated November 1989 for counts performed on February 23, 1989) prepared by David Plummer Associates in support of the Terminal Expansion DRI SD

- August 1989 DRI Application for Development Approval Question 31, Appendix, and Sufficiency Responses prepared by David Plummer Associates
- Final draft spreadsheet of proportional share road impacts prepared by Lee County DOT
- *Airport Master Plan Update Final Technical Report (Revised 2/11/92)*
- October 7, 1994 traffic impact statement for the Northeast Access Road entitled "1997 & 2002 Traffic Analysis for the Northeast Access Road" prepared by Greiner Engineering and included in the DRI NOPC for the Northeast Access Road
- 1995 Florida DOT I-75 Master Plan
- May 1998 "Vision 2010 Implementation Plan" (addressed only airport landside traffic patterns and parking needs)
- October 15, 1998 Final Report "1998 Travel Patterns on the SWFIA" O-D Study by Southwest Transportation Engineering, Inc.
- December 7, 1998 Preliminary Analysis HCS Runs prepared by RS&H
- Ongoing Lee County MPO Transportation Plans.
- Various Lee County DOT Annual Traffic Count Reports
- Annual SWFIA DRI Traffic Monitoring Reports
- Miromar Lakes DRI Traffic Study
- 2000/01 Alico/I-75 Interchange Improvement PDE Study
- I-75 Project Development and Environment Study in Lee and Collier Counties
- CFASPP Update, (traffic counts from January 29, 2001 thru February 1st on Chamberlin, Fuel Farm, and Doherty)

5.10.5 Airport Access Improvements

Southwest Florida continues to experience rapid urbanization due to increased demand from tourism and the relocation of retirees to the area. This rapid growth is reflected in the approved aviation enplanement forecasts presented in this Airport Master Plan Update, which expects an increase of enplanements from 2,632,088 in the year 2000 to 5,627,100 by the year 2020 (in other words doubling in 20-years or roughly a three percent increase per year). Continued growth of the region will result in continued increases in activity at the Airport and will also place heavy burdens on the local roadway network.

The Florida Intrastate Highway System (FIHS) Modal Plan, "Summary Report - Needs Assessment" June, 2000 states that the FIHS serves major international airports located in Florida, which handle over 90% of Florida's air freight and passengers. RSW is the only Florida Airport with international service not directly accessible to the FIHS.

A study was prepared recently which analyzed the nearby roadway system as a result of the opening of the Midfield terminal in 2005. This study, *Phase 2 – Final Report for Transportation Demands & Needs of the Southwest Florida International Airport Treeline Avenue/Terminal Access Road System* prepared by Southwest Transportation Engineering, Incorporated and Reynolds, Smith & Hills, Incorporated, September 7, 2000 was reviewed for this analysis.

This report analyzed 3 scenarios that included 3 different internal access road combinations. The third scenario was the preferred and selected scenario. This report also included 2 alternative traffic scenarios for each access scenario. The traffic scenarios were titled "Low Traffic" and

"Baseline Traffic." The results that are summarized in this report are from Scenario 3 for both Baseline and Low Traffic.

The intersections of Treeline Avenue at Daniels Parkway and Treeline Avenue at the Airport access road were determined to need grade separation to provide acceptable levels of service in the future. Otherwise, any other at grade improvements at these two intersections would result in LOS F. The intersection of BHG Parkway and Alico Road was not analyzed.

Additional analysis was undertaken to determine the year that a grade separation would first be required. Turning movements for each year between 2005 and 2020 for the Low and Baseline conditions were determined. These volumes were obtained by prorating the traffic between the 2005, 2010, and 2020 study years. These turning movement volumes were analyzed for each scenario to determine when a grade separation would be required. Grade separation would be required for Treeline Avenue at Daniels Parkway intersection by 2008 for the Baseline Traffic condition, and by 2013 for the Low Traffic condition.

For the Treeline Avenue at the Airport Access Road intersection, grade separation was not needed through 2020 for the Low Traffic condition. For the Baseline Traffic condition, it was determined that grade separation would be required by 2011.

Therefore, under the existing at grade configuration at the Airport Access Road Treeline Avenue will fail at approximately 2011. An alternative access must be provided to and from the airport to I-75 to maintain acceptable levels of service and reduce the volume of traffic on Treeline Avenue / BHG parkway. The direct connection to the interstate would provide relief to Treeline Avenue and would allow it to operate at acceptable levels of service for many years beyond its currently estimated life.

The previous Airport Master Plan Update approved by FDOT and the FAA in 1994 showed the need for direct access to I-75. This Interstate access connector, as proposed, was not implemented due primarily to spacing concerns. However, as listed above, FDOT is currently actively analyzing direct airport access to I-75 and it is recommended that the LCPA continue to work cooperatively with FDOT and Lee DOT on an acceptable solution.

Current Access Improvements

As mentioned earlier, numerous traffic studies have been prepared for the Airport. The Airport is currently constructing a North-South Roadway (Treeline Avenue/Ben Hill Griffin Parkway) parallel to I-75 that will service the new Midfield Terminal Complex. This roadway system is expected to be a temporary access solution and is predicted to experience a degredation in level of service by the year 2011 and 2012 without additional roadway improvements. The Phase 2 – Final Report of the Transportation Demands and Needs of the Southwest Florida International Airport Treeline Avenue/Terminal Access Road System, dated September 7, 2000, concluded that while the Treeline Avenue/Ben Hill Griffin Parkway will serve the interim needs of the new Midfield Terminal Complex, the proximity of the Treeline Avenue and Daniels Parkway intersection to I-75 limit its capacity and as traffic volumes increase other improvements would be required to maintain an acceptable level of service. The study also identified the need for a long-term solution to provide direct access to I-75 and to begin coordinating this solution with local, regional and state state transportation agencies. To respond to growth demands in the region the FDOT initiated a study to evaluate the I-75 Corridor in Lee and Collier Counties. This study also resulted in identifying recommended interchange solutions along this corridor, including access from I-75 to the Airport. This recommended alternative is presented below.

Concept "2FMR"

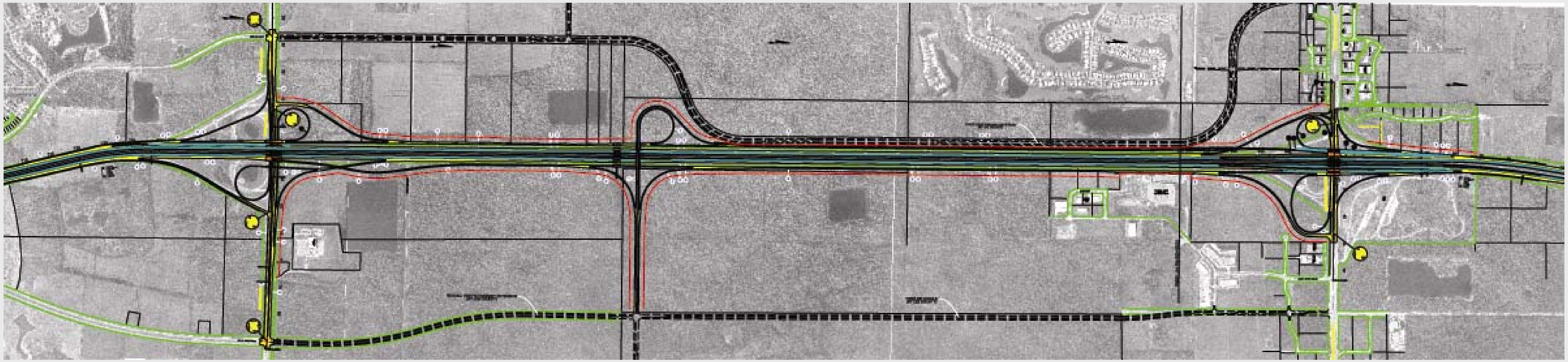
Concept "2FMR", shown on **Exhibit 5-6**, was produced as part of the FDOT Study Team efforts and is the recommended Airport access alternative. This alternative uses both Daniels Parkway and Alico Road interchanges along with a parallel Collector/Distributor Roadway System on the east and west sides of I-75. An interchange would be constructed with the C/D roads to provide Airport access. The proposal would provide for a direct connector to the Midfield Terminal Complex. While the intersection of this direct access connector with Treeline Avenue / Ben Hill Griffin Parkway is shown at grade, it is recommended that the LCPA explore the possibility of making this a grade separated interchange to enhance traffic flow. This improvement could also make the segment of the roadway system located on airport property eligible for FAA / FDOT funding. This concept, while still in preliminary stages appears to be the best strategy to accommodate direct access to I-75 from the airport while still meeting both Federal and State design standards. A Preliminary Design and Environmental Study (PD&E) is currently underway for this concept and further refinement of this concept is anticipated. It is recommended that the LCPA continue to assist Lee DOT in coordinating the need for improved airport access with FDOT to ensure it is accomplished in a compatible, phased and cost-effective manner.

Land Acquisition Recommended

Concept "2FMR" will be shown dashed on the Airport Layout Plan ensure continued agency coordination. The corridor for this alternative was used to determine possible future land acquisition requirements to provide direct access to I-75. For planning purposes, a 2,700 foot-wide corridor was assumed to be adequate with the south Airport drainage out-fall forming the southern boundary and then progressing northward 5,300 feet to the northern corridor boundary. Land acquisition requirements for the trumpet interchange and C/D system is estimated to be approximately 460 acres and will include some land acquisition west of I-75. This corridor is shown in **Exhibit 5-7**. This area should be sufficient to allow some alignment flexibility and provide storm water management detention/retention areas if necessary. It is important that the LCPA continue to work with Lee DOT, MPO and FDOT to investigate acquiring this corridor as soon as possible to provide access to Interstate 75. The area along the proposed TA/BHGP alignment is under extensive development pressure and any delay in the acquisition of this land will make acquiring access right-of-way to I-75 much more costly.

Exhibit 5-6

Concept "2FMR"



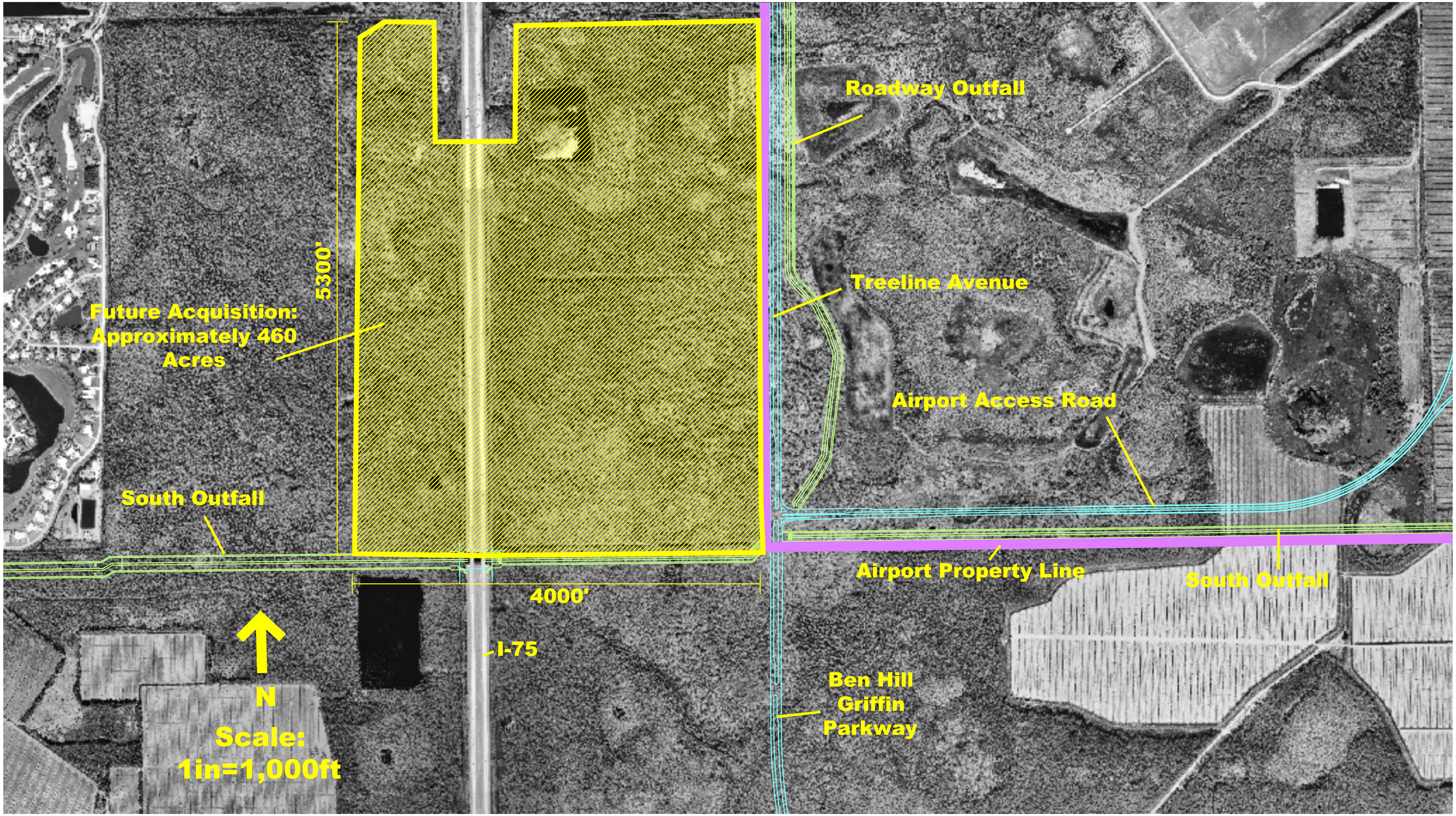
New Midfield Terminal Complex

Black	Proposed Roadway Improvements
Red	Road Right Of Way
Orange	Bridge / Fly-over
Green	I-75

Source: URS/Greiner, FDOT I-75 PD&E

Exhibit 5-7

Land Acquisition Map



Source: Reynolds, Smith and Hills, Inc. Analysis, 2002

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SOUTHWEST FLORIDA INTERNATIONAL AIRPORT
FORT MYERS, FLORIDA
MASTER PLAN UPDATE
FUTURE ROADWAY LAND ACQUISITION

EXHIBIT 5-7

5.10.6 Preliminary Estimates of Probable Costs

Preliminary Estimates for probable costs are shown in the financial chapter of this report. Identification of the agencies to lead the effort in acquiring the land necessary for the construction of this improvement are not available at this time.

5.10.7 Summary and Conclusions

Good accessibility is the lifeblood of any airport. The Airport accessibility problems can not be solved unless LCPA, FHWA, FDOT, the MPO and other interested groups and individuals work together to create an equitable, workable solution.

The overall functional design of Concept 2FMR, which has been included and referenced in this report, has been agreed to conceptually by the appropriate parties.

The overall Concept should continue to be refined by the appropriate agencies and decisions made regarding timing of construction, staging and funding.

However, to summarize:

- Southwest Florida resident and tourist populations are increasing at a rapid rate.
- Air transportation for passengers and freight is an integral part of the regional transportation system.
- Capacity constraints in the road system network reduce the effectiveness of the total transportation system.
- Passenger and freight air services are a vital link to the economic viability of the entire Southwest Florida region and therefore every effort should be made to enhance existing market share by providing the Airport with adequate access.
- Traffic studies confirm the need for access improvements and a link between Southwest Florida International Airport and I-75.
- Access alternatives will require continuing coordination among Transportation agencies and will probably require phasing for implementation. More detailed engineering and design studies will provide the exact layout, right-of-way needs and construction details for the project(s).
- It is important to acquire the right-of-ways as soon as possible because of intensive development pressure along TA/BHGP. Early coordinated acquisition of this property will save money, reduce future development impacts and ensure land needed for airport access.

5.11 FACILITY REQUIREMENTS SUMMARY

Table 5-33 summarizes the major facility requirements recommended for RSW throughout the 20-year planning period.

Table 5-33

TABLE 5-33
FACILITY REQUIREMENTS SUMMARY TABLE

TIMELINE	THROUGH 2005	2010	2020
Runways Runway 6L-24R Runway 6R-24L	Rehabilitate and Re-stripe Runway 6L-24R	New parallel Runway 6R-24L (9,100'X 150')	
Taxiways		Construct West Cross-Field Connector Taxiway Repair North Ramp New Parallel Taxiway for Runway 6R-24L Hold Bay & By-Pass Improvements to Runway 6-24 South parallel taxiway	Construct East Cross-Field Connector Taxiway Cross-Field taxiway to Midfield ramp connector
Cargo	Rehabilitate existing air cargo apron New Midfield Freight Forwarding Facility	Expand Air Cargo	Expand Air Cargo
Terminal	Terminal enhancements-existing building 28-gate Midfield Terminal (Phase 1) Security Enhancements to existing terminal and new Midfield Terminal	Demolition of existing terminal building 4-5 gate midfield terminal expansion (Phase 2)	11-14 gate expansion/new concourse (phase 3) Air Carrier Apron Expansion
Storm Water/Mitigation	Stormwater Master Plan Cargo Area Drainage Improvements Remove Mitigation Area "G"	Stormwater/Drainage Improvements	Stormwater/Drainage Improvements
Land Acquisition	Land east of Runway 24L-RPZ/Noise and power line relocation Land west of Runway 6R-Noise Land for I-75 access road	Mitigation Land Acquisition Continuation of Land Acquisition Program East of Runway 24L Land for I-75 access road	Mitigation Land Acquisition Continuation of Land Acquisition Program East of Runway 24L
GA Activity	Construct multi-use hangars	Construct multi-use hangars	Construct multi-use hangars Expand GA Apron
NAVAIDs	Upgrade to ASR-11 Upgrade VASI to PAPI (during runway Rehab)	Runway 24R ALS Precision GPS Approach	Runway 6L Cat. II ILS w/ALS upgrade Upgrade RVR for Runway 6L-24R Airport Rotating Beacon
Access	Cargo/perimeter road improvements Connector road for maintenance facilities Roadway Signage Modifications	Rehab perimeter, service and fuel farm roads Expand Entrance road to 6 lanes Rehab Chamberlin Parkway	Miscellaneous Roadway Improvements I-75 Airport Access
Supplemental Facilities			
Fuel Farm		Fuel Farm Expansion Improvements	
Flight Support	Aircraft Maintenance Facility Engine Run-up Facility/Hush-House	Relocate ATCT	
ARFF		Purchase of new ARFF vehicle Construct New ARFF facility-Mid-field	
Automobile Parking	Construct Mid-field surface parking Construct Mid-field parking garage Construct Mid-field taxi/limo parking	Expand surface parking (employee spaces) Expand garage parking (additional wings) Expand parking toll booth Rehabilitate existing parking lot	Add levels 4 and 5 to parking garage Expand surface parking
Miscellaneous	Utility improvements Rental car fuel farm (Midfield) Part 150 Noise Study	Relocate high voltage power lines Utility improvements Develop multi-modal center (freight) Design/Const. Infrastructure	Relocate rental car facilities Utility improvements Helipad Master Plan Update