SECTION 2
Purpose and Need

2.1 Introduction

As part of the Federal Aviation Administration (FAA) Order 5050.4A, *Airport Environmental Handbook* and FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures* the Purpose and Need is a required section of an Environmental Assessment (EA) that must document the objective of the Proposed Action and why the project is necessary for the airport. The need for a longer runway has been in the planning stages at TMB since the late 1970s. Business jet manufacturers continue to produce corporate jets at high rates. With newer more efficient and larger business jets on the horizon, and the continued success of fractional ownership programs throughout the United States, general aviation airports around the country have had to prepare and expand to meet the additional requirements these aircraft place on their facilities. This section of the EA will identify and document the purpose of the Proposed Action, document the need for the Proposed Action, discuss the Federal action requested, and provide a timeframe for the Proposed Action.

2.2 Purpose of the Proposed Action

The purpose of the extension of Runway 9R/27L at TMB is to:

1. Provide the required runway length to allow business jets to fly non-stop to medium and long haul destinations from TMB without imposing significant weight restrictions that result in limiting certain business jet aircraft from operating at the airport.

   The proposed extension of Runway 9R/27L from 5,002 feet to 7,350 feet will provide the necessary takeoff length required to operate most types of business jet aircraft without imposing severe weight penalties or requiring intermediate fuel stop when flying non-stop to medium or long haul destinations. Currently, the 5,002-foot runway length requires many of the existing general aviation jet aircraft operating at TMB to incur significant weight penalties or make a refueling stop due to the current runway length limitation. This results in inefficient operations and lost revenues to the operators, tenants, and ultimately, MDAD and Miami-Dade County. Discussions with the fixed-based operators (FBO) at TMB indicated a number of medium and long haul destinations to which many of their jet tenants and clients operate. These destinations include much of the continental United States (east and west coast), the Carribean, Central and South America including specific references to various cities including Seattle, La Paz, Sucre,

Salvador and Rio de Janeiro. Also referenced were various countries including Ecuador, Guyana, Colombia, and Peru[1].

2. Provide TMB the necessary runway length required to fulfill its role as a designated reliever airport as defined in the 2005 National Plan of Integrated Airport Systems.

   In keeping with TMB's role as a reliever to Miami International Airport, the goal of MDAD is to provide convenient and flexible access to both domestic and international destinations through general aviation jet operators at TMB. MDAD considers TMB an essential aviation facility that is a key component in the Miami-Dade County airport system. In FAA Order 5090.3C, a reliever airport is defined as an airport that relieves airport congestion at a commercial service airport and provides general aviation access to the overall community. The Order also states that the reliever airport should be located in such a manner, with respect to the city center or business or industrial district served by the relieved airport, that it will provide essentially the same user conveniences as those provided by the relieved airport. TMB is only 13 miles southwest of the Miami central business district, and only 7 miles west of the Biscayne Bay shoreline. Based on the current runway length of 5,002 feet TMB can not fully function as a designated reliever because it can not adequately serve the growing business jet market of the region and nation due to the insufficient runway length. This is documented through letters received by aircraft operators. These letters are included in **Appendix A**.

3. Provide additional safety measures for all operations with additional runway length in the event of an emergency situation upon takeoff or landing.

   Extending the runway will provide an additional margin of safety for all operations at the airport. Departing aircraft will have more runway available to accommodate emergency procedures. Arriving aircraft will have more room to land and reduced potential for overruns and damage to aircraft.

2.3 Need for the Proposed Improvements

2.3.1 Accommodate the Length Requirements for Existing and Future Fleet of GA Business Jet Aircraft

Runway length needs for an airport are dependent on the performance characteristics and operational frequency of either a specific aircraft or group of aircraft operating at an airport. In identifying length requirements a number of influencing factors such as stage length, load, runway gradient, and meteorological conditions require consideration.

Aircraft stage lengths of jet aircraft from TMB range between a few hundred nautical miles away to long haul destinations over 3,500 nautical miles away. The length of haul an aircraft flies is directly related to how heavy the aircraft is when it departs an airport. For the purposes of

[1] See TMB Airfield Needs Assessment and Partial ALP Update Report dated September 2005 Page II-17.

determining the runway length requirements, a conservative estimate for the average length of haul was set at 2,000 nautical miles.[2]

In reviewing the meteorological conditions at TMB, wet weather conditions during the summer months in southeastern Florida are particularly common with daily rainfall events occurring in heavy downpours in the afternoon and early evening when a significant portion of operational activity is occurring at the Airport. Both wet and dry runway conditions were calculated to depict the runway lengths required by specific aircraft. Due to the frequent wet weather conditions experienced at TMB, wet runway conditions were used in determining the required runway takeoff lengths.

For long range planning the FAA has developed a runway length software program that is associated with the Airport Design (AC 150/5300-13) guidance. This software factors several airport specific elements such as airport elevation, temperature, runway centerline elevation differences, stage length (for aircraft over 60,000 pounds) and runway weather conditions to determine a general assessment of runway length needs.

The following conditions were used as input to the FAA program to determine a general runway length for the primary runway at TMB:

Airport Elevation	*8 feet*
Mean daily maximum temperature of the hottest month	*90˚F*
Maximum difference in runway centerline elevation	*1.0 feet*
Length of haul for airplanes of more than 60,000 pounds	*2000 nautical miles*
Runway condition	*Wet/slippery*

The results of the software calculations indicate that the existing 5,002-foot runway is not sufficient to accommodate 75 percent of the large aircraft (60,000 pounds or less) with useful loads of 60 percent or greater (see Table 2.1).

TABLE 2.3-1
FAA RUNWAY LENGTH RECOMMENDATIONS

Small airplanes with approach speeds of less than 30 knots	300 feet
Small airplanes with approach speeds of less than 50 knots	800 feet
Small airplanes with less than 10 passenger seats	
75 percent of these small planes	2,500 feet
95 percent of these small planes	3,070 feet
100 percent of these small planes	3,630 feet
Small planes with 10 or more seats	4,260 feet
Large airplanes of 60,000 pounds or less	
75 percent of these large airplanes at 60 percent useful load	5,350 feet
75 percent of these large airplanes at 90 percent useful load	7,000 feet
100 percent of these large airplanes at 60 percent useful load	5,500 feet
100 percent of these large airplanes at 90 percent useful load	8,310 feet
Airplanes of more than 60,000 pounds Approximately	7,600 feet

Source: FAA Airport Design Software, ESA Analysis 2006.

[2] See TMB Airfield Needs Assessment and Partial ALP Update Report dated September 2005 Page II-17.

Airplanes of more than 60,000 pounds, include the Gulfstream II, III, IV and V, as well as the Bombardier Global Express, and a number of newer aircraft are expected to enter into the business jet market over the next couple of years. These new aircraft include the Bombardier Global 500, the Dassult Falcon 7X, and the Gulfstream 350, 400, 450, 500 and 550. All of these aircraft types could require a runway length of more than 7,000 feet depending on the load and haul distance. With the Airport's defined role in the *National Plan of Integrated Airport Systems* as a reliever airport, MDAD believes it is necessary to accommodate as much of the general aviation jet fleet as possible especially given the long range markets identified by existing TMB tenants.

Based on the FAA's general guidelines for determining runway length, a runway length of 7,000 feet would accommodate roughly 75% of the large airplanes at 90 percent useful load under wet runway conditions without requiring operational penalties or restrictions. The maximum runway length that could be constructed given MDAD's desire to accommodate the runway and associated facilities all on airport property is 7,350 feet. A 7,350-foot runway would allow approximately 80-85% of the large aircraft to operate at 90 percent useful load. This is important for the longer stage lengths and the markets identified by the operators at TMB. In considering all of the factors associated with this runway extension it was determined that the runway should be extended to the maximum possible 7,350 feet[3]. The 7,350-foot runway will give pilots operating at TMB greater flexibility in meeting the stage length and payload requirements for aircraft under 60,000 pounds and those over 60,000 pounds. The 7,350 foot runway will also accommodate both the current and future business jet fleets under the present climate conditions experienced in South Florida. Specifically, this length would accommodate aircraft during periods of high humidity and temperatures as well as under wet runway conditions.

While the FAA software is a good tool for long range planning, a more thorough look at specific aircraft was prepared using individual aircraft characteristics and performance manuals to further document the need for the 7,350 foot runway. With aircraft type frequency data provided by the airport, Air Traffic Control and airport tenants, Table 2.2 was created to outline performance characteristics of a number of different jet aircraft types that currently operate at TMB.

[3] See TMB Airfield Needs Assessment and Partial ALP Update Report dated September 2005 Page II-25.

TABLE 2.3-2
BUSINESS JET RUNWAY LENGTH REQUIREMENTS

Aircraft Manufacturer	Aircraft Model	ARC	Required Dry Runway Takeoff Length (feet) /a/	Required Wet Runway Takeoff Length (feet) /a/	2005 Operations
Bombardier	Challenger 600	B-II	6,253	7,191	230
Bombardier	Global Express	C-III	6,508	7,484	20
Bombardier	Learjet 55C	C-I	6,482	7,454	220
Bombardier	Learjet 60	C-I	6,311	7,258	240
Dassault	Falcon 900	B-II	6,138	7,058	70
Dassault	Falcon 2000	B-II	6,733	7,743	130
Gulfstream	G-II	D-II	6,513	7,490	175
Gulfstream	G- IV	D-II	6,311	7,258	300
Gulfstream	G-V	C-III	6,935	7,975	100
Gulfstream	G-200	C-II	6,369	7,324	25
Raytheon /b/	Hawker 1000	C-II	6,740	7,880	100
Raytheon	Hawker 125-800	B-II	6,230	7,165	740
Rockwell	Sabreliner 65	C-II	6,311	7,258	30
Rockwell	Sabreliner 75	C-II	6,369	7,324	40
Operations by aircraft that could require more than 7,000 feet of Runway					2,350
Operations by aircraft that could require more than 7,350 feet of Runway					770

/a/ This data assumes maximum takeoff weight, 90˚F Temperature, zero wind and an airport elevation of 8 feet.
/b/ Data supplied by NetJets, 2006.
Source: Airfield Needs Assessment 2004 - prepared by Ricondo & Associates. ESA Airports analysis.

As can be concluded from Table 2.2, all of the aircraft types depicted could currently be subjected to weight restrictions when departing TMB as a result of the current runway length.

In 2003, jet aircraft operations at TMB accounted for approximately 10.7% of the total aircraft operations and 21% of all itinerant activity. Table 2.2 outlines only a sampling of the business jet aircraft that operate at TMB and does not include all of the jet aircraft that currently operate at the Airport. Based on the 2005 operations activity gathered from the Aircraft Noise and Operations Monitoring System (ANOMS) data, ATCT counts and interviews with the airport tenants and FBOs, roughly 770 operations occurred by aircraft that could benefit from a runway length of 7,350 feet or greater. This is anticipated to increase to roughly 1,200 operations by 2009 with an extended runway in place. During the same period, it was determined that 2,350 operations occurred by aircraft that could benefit from a runway length of 7,000 feet or greater. Similarly, this is anticipated to increase to roughly 3,280 by 2009 with an extended runway in place. The FAA typically requires at least 500 annual itinerant operations to justify the need for an extension. The need for a 7,350 foot runway can not only be documented for existing conditions but also for future conditions once the extension is in place.

2.3.2 Allow Airport to Function in its Defined Role as a Reliever

The FAA has developed a Regional Guidance Letter (RGL 00-01) establishing regional policy on what development should be considered when planning for the development of an airport/runway intended for business jet aircraft at a general aviation reliever airport. Table 2.3 outlines the recommended development in the RGL.

TABLE 2.3-3
RELIEVER AIRPORT CRITERIA

Development	GA Reliever Airport	Existing at TMB
Minimum Runway Length	6,500 feet /a/	no (5,002 feet) /b/
Full Parallel Taxiway	yes	yes
VGSI	yes	yes
REIL	yes	yes
Grooving	yes	no
Minimum Instrument Approach	Precision (200- 1/2)	yes
Instrument Landing System	ILS, WAAS/LAAS	yes
Approach Lighting System	yes	yes
AWOS	yes	yes
Blast Pads	yes	no /c/
Lighting	HIRL	yes
Pilot Controlled Lighting	yes	yes
Ground Communications Outlet	yes	yes
Meet AC 150/5300-13	yes	yes
Compatible Land Use Zoning	yes	yes
Pavement Strength	60,000 DW	65-SW, 110-DW, 195-DT

/a/ The RGL states that the runway length should be determined on a case by case basis to meet the needs of design aircraft.
/b/ The Proposed Action would extend the runway length at TMB.
/c/ Blast pads do not currently exist but the Proposed Action does include blast pads at both runway ends.

The only three components TMB does not meet as part of the RGL is the minimum runway length requirements, pavement grooving and the blast pads. The Proposed Action does include blast pads as part of the extension for both runway ends.

In order to further determine the need for the extension, a key airport operator was contacted. Net Jets, just one of the several companies which operate jet aircraft for fractional owners, provided additional information regarding specific aircraft that they operated at TMB over the last several years. In 2005, Net Jets alone conducted over five hundred operations at TMB with business jet aircraft and the company anticipates that number will grow in 2006 and beyond. Below, Table 2.4 summarizes the table from the Net Jet letter (see **Appendix A)** and outlines specific aircraft and compares the weight penalties of the existing 5,002 foot runway under both dry and wet runway conditions.

TABLE 2.3-4
WEIGHT PENALTIES EXISTING RUNWAY (Net Jet Operations Only)

			90 ° F Dry Conditions		90 ° F Wet Conditions	
Aircraft Type	MTOW	OEW	Useful Load	Penalty	Useful Load	Penalty
Hawker 800Xp	28,000	16,000	8,687	-28%	NC	NC
Hawker 1000	31,000	18,000	6,465	-50%	1,067	-92%
Falcon 2000	36,500	22,750	9,893	-28%	8,477	-38%
Gulfstream 200	35,450	19,800	9,553	-39%	5,046	-68%
Gulfstream IV	74,600	43,500	23,152	-26%	18,824	-39%
Gulfstream V	90,500	48,400	28,888	-31%	NC	NC

Source: ESA Analysis 2006 and Netjets Company
MTOW stands for Maximum Takeoff Weight.
OEW stands for Operating Empty Weight.
Useful Load is the MTOW minus the OEW adjusted for runway length, temperature, etc.
NC not provided by aircraft manufacturer for these conditions.

Reducing the useful load to satisfy the runway length reduces the viability of TMB to function in its role as a true reliever airport. Accessibility to highways and arterial roadways is good and is going to improve with the planned roadway modifications and enhancements for the area around the Airport. Other existing facilities at TMB are in good condition and the airport has proven it can serve and attract the larger business jets. In support of these observations it was noted that jet fuel sales has increased by 7% over last year and the TMB customs facility has been clearing between fifteen and eighteen aircraft a day since January 2006, a marked increase from previous years. Over 250,000 square feet of additional hangar space is planned to be constructed and opened by 2007 and several airport tenants have commitments by larger jet operators to base at TMB once the additional hangars are operational.

While the airport has shown it can be successful in serving the business jet segment of the industry, the current runway length has been cited in numerous instances by aircraft operators as the reason they are not operating at TMB. Letters documenting the need for a longer runway have been included in **Appendix A**. Additionally, discussions with the FBOs at TMB have indicated that the Airport is not able to meet the current demand. According to one of the FBOs, they recently lost two clients that fly the Learjet 60 and another client that operates a Learjet 55 all because of a lack of sufficient runway length at TMB to operate at full payload. Reliance Aviation, which is another FBO at TMB, indicated that they are planning to accommodate two to three additional Gulfstream II/III and looking at potentially accommodating two Gulfstream V[4]. Falcon Air, the newest FBO at TMB, opened in 2004 and has a number of jet tenants and a business plan that targets the high end business jet operators.

According to the FAA Terminal Area Forecast for 2005, aircraft operations totaled 178,690 and TMB had over 450 based aircraft. Jet operations totaled approximately 19,120 operations and 16 jet aircraft were based at TMB in 2005. Jets are operating at TMB but the airport is not able to meet the demands of many operators especially those who desire to operate at high useful loads and non-stop to longer haul destinations.

[4] See TMB Airfield Needs Assessment and Partial ALP Update Report dated September 2005 Page II-5.

2.3.3 Improve Operational Safety Margin for Aircraft and the Public

The runway extension will provide a number of safety enhancements at TMB. The Accelerate Stop Distance (ASDA) and the Landing Distance Available (LDA) would be increased for both departing and landing aircraft. The ASDA increase would give pilots more distance and time to make a decision to continue with the takeoff, or abort the takeoff and safely stop the aircraft in the event of an emergency during the takeoff roll. The LDA would also give pilots more time and distance to safely land the aircraft, decelerate and stop safely in the event of an emergency. Due to an extension at both runway ends, aircraft would begin their takeoff roll further back (compared to the existing runway) and most aircraft would attain higher altitudes when flying over residential areas and businesses in proximity to the airport.

2.4 Requested Federal Action

The FAA should find that this EA fully documents and assesses the purpose and need, alternatives, affected environment, environmental consequences and potential mitigation associated with the Proposed Action. The requested Federal Action being analyzed in this EA includes extending Runway 9R-27L to a total length of 7,350 feet. The extension includes a 550-foot extension to the east end of the runway and a 1,798-foot extension to the west end of the runway and associated taxiways, lighting and navigation aid relocation.

Discretionary and non-discretionary Federal actions that may be required include the approval of the Airport Layout Plan (ALP), the approval of further processing of an application for federal assistance using Airport Improvement Program (AIP) grants, and approval of appropriate amendments to the Airport Certification Manual pursuant to 14 CFR Part 139.

2.5 Timeframe of Proposed Action

Implementation of the proposed Runway 9R-27L extension would be done immediately to relieve the operational weight restrictions and penalties associated with certain business jets currently operating at TMB and enhance the overall safety and level of service at the airport. The proposed runway extension should be designed and constructed as soon as FAA determines a favorable finding to the Environmental Assessment and as soon as the Federal, State and local permits and approvals are granted by appropriate agencies as necessary. The anticipated timeframe for the extension to be operational is the year 2009.