5.H.3 LIGHT EMISSIONS AND VISUAL IMPACTS

Airport facilities are illuminated by various types of lighting. These lights can emanate from the airfield (including runway, apron, and navigational lighting) and from landside sources (including buildings, roadways, and parking facilities). Other lighting is located along taxiways and ramps for guidance during periods of low visibility, and to assist aircraft movement on the airfield (i.e. hold position lights, stop-bar lights, and runway and taxiway signage). Aircraft lighting, such as landing lights, position and navigation lights, beacon lights, and vehicle lighting are other types of light sources on the airfield.

Land uses in the vicinity of FLL vary from light industrial and commercial, to residential as described in Section 5.C.2, *Land Use Compatibility*.

5.H.3.1 Current Airport Lighting Effects on Residential Areas

Exhibit 5.H.3-1, *Current Airport Light Emissions*, graphically depicts the various light sources associated with FLL and depicts the surrounding environs that could be affected. The existing airfield, terminal, landside, and other aviation-related facilities are shown. Many of the surrounding residential areas are shielded from airport light emissions, primarily due to the buffer of undeveloped and compatible land uses around the airport, such as major highways, industrial development, noise berms, mature trees, and the distance of residential structures from the airport.

On-airport lighting in the south airfield near the residential community of Melaluca Gardens is partially obstructed by the 37.88-acre greenbelt berm (Aviation Greenbelt) and landscaped area that exists along the north side of Griffin Road. This Aviation Greenbelt is managed by Broward County. Along the south side of Griffin Road airport light emissions are obstructed by a concrete barrier and vegetation. Along the northern boundary of FLL airport light emissions are obstructed by Interstate-595, industrial land uses, and buildings north of Interstate-595.

Light emissions are similarly buffered west of the airport along the Interstate-95 corridor and the industrial land uses that border the west side of FLL. Port Everglades borders the airport to the east, acting as a buffer and reducing any effect of airport light emissions on residential areas to the east.

5.H.3.2 Terminal, Aviation Facility, and Landside Lighting

The light sources associated with the terminal, landside, and other aviation facilities vary significantly at FLL. The primary light source within the terminal area is emitted from the automobile parking facilities on the landside and the aircraft parking areas surrounding the concourses on the airside. The automobile parking and apron areas associated with other on-airport aviation facilities, such as general aviation/FBO, cargo, and aircraft maintenance facilities, are primary sources of light. Vehicular traffic on roadways and the apron areas contribute to light emissions on both the apron and landside areas.

5.H.3.2.1 APRON LIGHTING

Apron lighting enhances operational safety and security within the aircraft parking ramp areas of the terminal complex, general aviation/FBO facilities, and cargo aircraft parking/loading and unloading areas. These lights are typically elevated on lighting masts and/or the exterior of building structures, and directed down onto the apron areas to minimize their affects on the airfield operating area and final approach areas. Apron lighting is provided at the various aviation facilities located immediately north and west of the airfield.

5.H.3.2.2 LANDSIDE LIGHTING SOURCES

The primary light source from the terminal's landside component is associated with the lighting within the parking garages. The airport is served with three multi-level parking garages in the terminal core: the Palm, Hibiscus, and Cypress garages. The Palm Garage has four levels, the Hibiscus Garage has seven levels, and the Cypress Garage has nine levels.

FLL has several remote parking facilities located west of the airfield. These lots are all at-grade and include the Remote Tower lot, Park-N-Save lot, Holiday Parking lot, and the employee parking lot. Most of the remaining airport tenant facilities have public and employee parking facilities distributed throughout the airport property and all are at-grade.

5.H.3.3 Existing Airfield Lighting

The airfield is illuminated by a variety of lighting aids to facilitate airport identification for approach, landing, taxi operations at night, and during adverse weather conditions. The existing airfield lighting equipment at FLL is summarized in **Table 5.H.3-1, *Airfield Lighting***. These lighting systems are described in the following paragraphs.

5.H.3.3.1 APPROACH LIGHTING SYSTEMS

Approach lighting systems use medium- and high-intensity lights to guide aircraft to the runway centerline as a flight progresses through the transition from instrument flight to visual flight during landing. Currently, only the approach ends of Runway 9L/27R are equipped with an approach lighting system, both of which are comprised of a Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR). No other approach light systems serve any of the runways at FLL.

Table 5.H.3-1
AIRFIELD LIGHTING[1]
Fort Lauderdale-Hollywood International Airport

LIGHTING AIDS	RUNWAY END					
	9L	27R	9R	27L	13	33
Approach Light Systems						
Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR)	MALSR	MALSR	-	-	-	-
Visual Glideslope Indicators						
Precision Approach Path Indicator (PAPI)	PAPI	PAPI	PAPI	PAPI	PAPI	PAPI
Runway End Lights						
Runway End Identifier Lights (REIL)	-	-	-	-	-	-
Runway Edge Light Systems						
High-Intensity Runway Lights (HIRL)	HIRL	HIRL	MIRL	MIRL	MIRL	MIRL
In-Runway Lighting systems						
Runway Centerline Lighting System (RCLS)	-	-	-	-	-	-
Touchdown Zone Lights (TDZL)	-	-	-	-	-	-
Instrument Landing System						
Category (CAT)	CAT I	CAT I	-	-	-	-

Source: Airport Facility Directory, Southeast U.S., 2005.

Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR): The MALSR provides arriving aircraft additional visual representation of the runway environment, thereby enhancing arrival capacity of the airfield. It allows a reduction in the visibility minimums established for the instrument approach procedure(s) established for the runway. A diagram of a standard MALSR lighting system is graphically depicted on **Exhibit 5.H.3-2, *Approach Lighting System***. At FLL, only the approach ends of Runways 9L and 27R are equipped with a MALSR lighting system.

Standard MALSR runway threshold lights start 200 linear feet from the landing threshold and extend at 200-foot intervals into the approach area for a distance of 2,400 to 3,000 feet for precision instrument runways and 1,400 to 1,500 feet for non-precision instrument runways. There are generally seven light bars with five steady-burning lights for each bar. At the centerline light bar, which is 1,000 linear feet from the runway threshold, there are two additional bars (one on each side of the centerline bar), each with five steady-burning white lights.[13]

As the name implies, the lights of the MALSR lighting system are of medium-intensity and equipped with intensity control. The lights are white, steady burning, and generally equivalent to a 150-watt floodlight. Sequenced flashing white lights supplement the centerline light bar, starting 1,500 linear feet from the last light bar, and continuing out to 3,000 linear feet from the runway end. Those lights

[13] FAA Advisory Circular 150/5340-30, *Design Installation Details for Airport Visual Aids,* April 30, 2004.

flash in sequence toward the landing threshold at a rate of two times per second. The lights are mounted on poles and aimed with their beam axes parallel to the runway centerline. The lights extend 2,400 feet from their respective landing thresholds.

Visual Glideslope Indicators: Visual Glideslope Indicators are a system of lights arranged to provide visual descent guidance information during the approach to a runway. There are two types of visual glideslope indicators, the Visual Approach Slope Indicator (VASI) and the Precision Approach Path Indicator (PAPI). Due to the enhanced precision associated with the PAPI systems, the FAA is replacing all VASIs with PAPIs at FAR Part 139-certified airports. Each runway end at FLL is equipped with a PAPI system.

The PAPI lighting system provides a definite light pattern when the aircraft is on the desired descent path to the touchdown point. The visual path of the PAPI provides safe obstruction clearance within ten degrees on either side of the extended centerline and up to six nautical miles from the runway threshold. This approach system is a visual aid, which provides vertical guidance during the approach to a runway and is visible to the pilot along the flight path from three to five miles out during daylight, and up to 20 miles or more at night.

The PAPI system at FLL consists of four light units on either the left or right side of the runway touchdown zone. Each light contains a split filter that emits either a red or white light beam depending on the angle between the light and the arriving aircraft. Each light projects a beam of light having a white segment in the upper part of the beam and red segment in the lower part of the beam. The light units are arranged so that the pilot using the PAPI during an approach will see the combination of lights, indicating if the aircraft is above, below, or on the desired approach path. Therefore, the red lenses of the PAPI light units are typically visible from the ground.

Runway/Taxiway Edge Lights*:* Runway and taxiway edge lights are used to define the boundaries of runways and taxiways at night or during adverse weather conditions. The runway edge lights are white, except on the last 2,000 feet of instrument approach runways, where they are amber, indicating the caution zone. Taxiway edge lights are blue and spaced at intervals between 50 and 200 feet. Runway edge lights are installed in intervals of 200 feet. Runway and taxiway edge lights have a typical height of 14 inches above the pavement elevation. These lights are classified according to the intensity or brightness they are capable of producing. At FLL, Runway 9L/27R is equipped with High Intensity Runway Lights (HIRL), while Runways 13/31 and 9R/27L are equipped with Medium Intensity Runway Lights (MIRL).

In-Runway Lighting Systems: In-Runway Lighting Systems indicate the location of the runway centerline and/or the runway touchdown zone at night or during adverse weather conditions. In-runway lights are installed semi-flush with the pavement. Two types of in-runway lighting systems are typically used at airports -- Runway Centerline Light Systems (RCLS) and Touchdown Zone Lights (TDZL). Currently, the runways at FLL are not equipped with in-runway lighting systems.

Rotating Beacon: A rotating beacon, containing the universally accepted optical system for lighting airports, identifies the location of the airport. This beacon projects alternating green and white beams from dusk to dawn. When activated during daylight hours, the beacon indicates ground visibility of less than three miles and/or a ceiling of less than 1,000 feet.

The FLL airport beacon is located north of the airfield, immediately east of the current FedEx cargo apron. The rotating beacon sits on an independent structure and is elevated high enough to avoid the obstructions of nearby buildings and structures.

THIS PAGE INTENTIONALLY LEFT BLANK