Miami International Airport

Airport Layout Plans Set Narrative Report

PREPARED FOR:

Miami-Dade Aviation Department

PREPARED BY:

RICONDO & ASSOCIATES, INC.

RICONDO & ASSOCIATES

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A. Executive Summary

In 2008, the Miami-Dade Aviation Department (MDAD) initiated the Strategic Airport Master Planning study (SMP) for the Miami-Dade County System of Airports. The SMP serves as an update to the master plans for the County's System of Airport comprising Miami International Airport (MIA or the Airport) and its four general aviation airports: Miami-Opa Locka Executive Airport (OPF), Miami Executive Airport (TMB), Miami Homestead General Aviation Airport (X51), and Dade-Collier Training and Transition Airport (TNT). The SMP defines MDAD's overall approach to implementing the long-term capital needs for its airports to continue providing a high level of service to the surrounding communities. Rather than preparing a comprehensive master plan document for each of the five airports, MDAD has documented the individual analyses in a series of PowerPoint presentations. In lieu of submitting a comprehensive airport master plan report to the Federal Aviation Administration (FAA), MDAD has elected to submit stand-alone Aeronautical Forecasts documents and Airport Layout Plan (ALP) set for FAA review and approval. The aeronautical forecasts for MIA were approved by the FAA on July 21 2011.

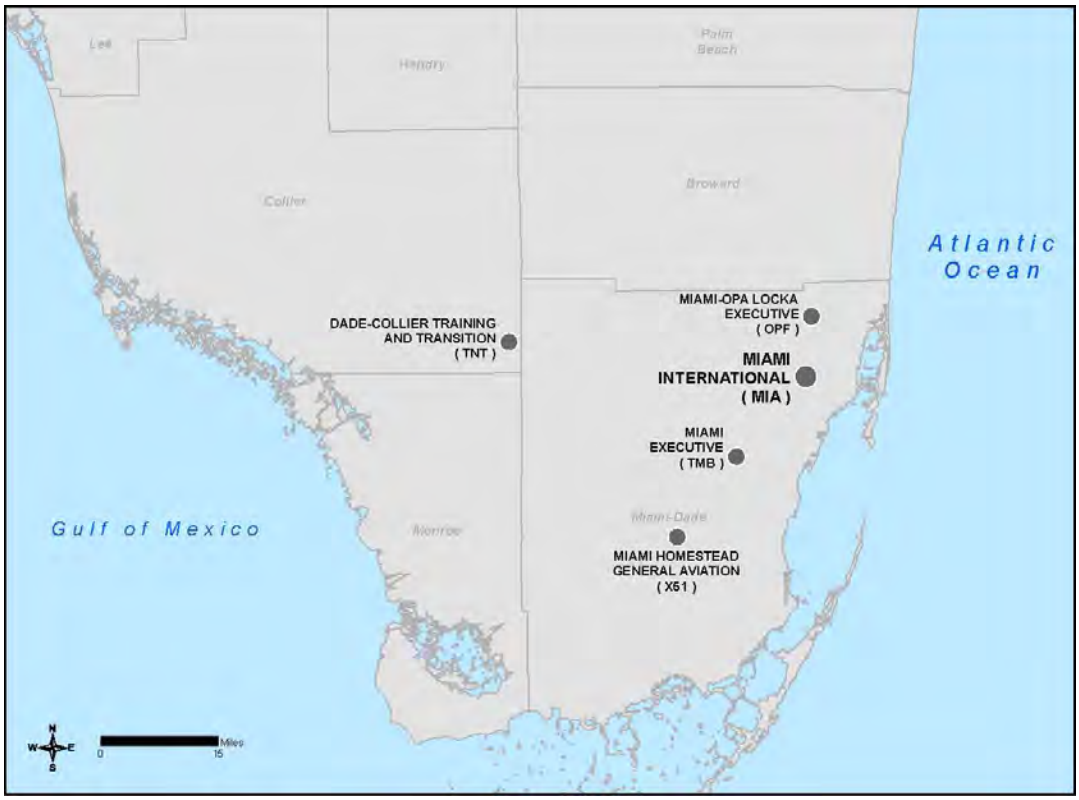
This ALP Narrative Report describes the planning and rationale that resulted in the identification of a preferred development scenario for MIA, and summarizes the drawings included in the ALP set. The purpose of the ALP set is to provide Airport management with a scaled, graphic presentation of the Airport's 20 year development program, as presented in the SMP for 2015 through 2035. The ALP set also provides information such as specific Airport data (i.e., runway coordinates, design aircraft), a graphical depiction of airspace surfaces (i.e., Title 14 Code of Federal Regulations Part 77 [14 CFR Part 77] imaginary surfaces, *United States Standard for Terminal Instrument Procedures* [TERPS] departure surfaces, threshold siting surfaces), land use information, and property boundaries. The ALP drawing sheets identify areas for future aviation-related development, as well as available land that can be used for revenue generation to support the Airport. The ultimate configuration of Airport facilities demonstrates a feasible improvement plan that provides for safe, compatible, and efficient Airport operations.

The dimensional information provided in the drawings demonstrates compliance with minimum airport design standards established by federal, state, and local authorities. This ALP set was developed in accordance with the guidance outlined in FAA Advisory Circulars (ACs) 150/5070-6B (Change 2), *Airport Master Plans*, and 150/5300-13A (Change 1), *Airport Design*, and the Florida Department of Transportation's (FDOT's) *Guidebook for Airport Master Planning*. Furthermore, the ALP set was reviewed for compliance with the FAA's ALP Checklist-ARP SOP 2.00 which is provided in **Appendix A** of this document**.** The ALP set will be revised over time to reflect new facility and infrastructure development and proposed changes to planned development at MIA so that the FAA and FDOT will be continually updated regarding current conditions.

Exhibit A-1 illustrates the locations of the five airports operated by MDAD. As one of the largest commercial service airports in the United States, MIA is designated by the FAA as a Large Hub Primary Commercial Service Airport. This designation refers to publicly owned airports that serve at least 1.0 percent of the annual enplaned passengers in the United States. MIA is located on approximately 3,230 acres of land 8 miles northwest of downtown Miami.

MIA is the largest U.S. gateway for Latin America, and one of the largest airline hubs in the United States because of its proximity to tourist attractions, local economic growth, large local Latin American and European populations, and its strategic location to accommodate connecting traffic between North America, Latin America, Western Asia, and Europe. It is South Florida's main airport for long-haul international flights.

Exhibit A-1: Miami-Dade County Airport Locations



SOURCE: ESRI Data and Maps, Version 10, February 20, 2015
PREPARED BY: URS Corporation, February 2015.

MIA is also the primary Latin American gateway for American Airlines. It serves as a domestic hub for American's regional affiliate American Eagle, Eastern Air Lines, as well as a regional hub for cargo carriers UPS Air Cargo and FedEx, and charter airline Miami Air International. MIA is also a focus airport for Avianca, Frontier Airlines, LAN Airlines and its subsidiaries, and TAM Brazilian Airlines, both for passengers and cargo operations. The Airport serves passenger and cargo flights to cities throughout the Americas, Europe, and Western Asia, as well as cargo flights to East Asia.

MIA has four air carrier aircraft runways, consisting of three parallel east-west Runways 8L-26R, 8R-26L, and 9-27 and crosswind Runway 12-30. The crosswind runway will be redesigned as Runway 13-31 in 2018. The parallel runways are 8,600 feet, 10,506 feet, and 13,016 feet long, respectively, and Runway 12-30 is 9,355 feet long. Runways 8L-26R, 9-27, and 12-30 are each 150 feet wide and Runway 8R-26L is 200 feet wide. Runways 8R-26L and 9-27 are equipped with precision approach capabilities. With the exception of Runway ends 8L and 26R, the other runway ends at MIA can accommodate Category I instrument landing system (ILS) precision approaches. Runway ends 8L and 26R provide for non-precision localizer-only approaches. **Table A-1** summarizes the predominant characteristics of the runways at MIA.

Table A-1: Miami International Existing Airport Runway Characteristics

CHARACTERISTIC	8L-26R	8R-26L	9-27	12-30 (FUTURE 13-31)
Length (feet)	8,600	10,506	13,016	9,355
Width (feet)	150	200	150	150
Runway Design Code	D/V/5,000' - D/V/4,000'	D/V/2,400' - D/V/4,000'	D/V/2,400'	D/V/4,000'
Approach Capability	Non-precision	Precision	Precision	Precision
Lowest Visibility Minimums	1 mile – 7/8 mile	1/2 mile – 3/4 mile	1/2 mile	3/4 mile

SOURCES: Federal Aviation Administration, Advisory Circular 150/5300-13A (Change 1), *Airport Design*, February 26, 2014; Federal Aviation Administration, *Terminal Instrument Approach Procedures*, December 2014; Ricondo & Associates, Inc., November 2015.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

The aeronautical forecasts for MIA include annual and peak period aircraft operations that would be accommodated at the Airport for the 2009 Base Year and for three additional planning periods, referred to as planning activity levels (PALs):

- PAL 1 – reflective of the demand level projected for 2025 under the SMP's Baseline Forecast
- PAL 2 – reflective of the demand level projected for 2035 under the SMP's Baseline Forecast
- PAL 3 – reflective of the demand level projected for 2050 under the SMP's Baseline Forecast

For long range planning and assisting MDAD with long-range strategic planning, the demand levels associated with PAL 3 were estimated during the preparation of the aeronautical forecasts. Since these forecasts exceed the 20-year planning horizon, the facility required to serve PAL 3 are not depicted on the ALP and therefore not presented herein. Consistent with the current FAA approved ALP for MIA, the future ALP depicts the additional property acquisition that may be required to serve the demand levels projected for PAL 2 and beyond.

The aeronautical forecasts for MIA represent unconstrained conditions for future aviation activity without consideration of existing or potential capacity constraints. These forecasts also provide justification for planning and development recommendations contained in the SMP. The various forecast metrics, such as aircraft operations, annual itinerant operations (including annual itinerant operations by the current and future

critical aircraft), based aircraft, annual instrument approaches, and annual passenger enplanements at MIA, are summarized in **Table A-2**.

Table A-2: Miami International Airport Aeronautical Forecasts Summary

FORECAST METRIC	2009 (ACTUAL)	PAL 1 (2025)	PAL 2 (2035)
Annual Passenger Enplanements	17,027,000	23,037,000	29,460,000
Annual Cargo Enplanements (tons)	1,699,219	3,054,194	4,835,351
Annual Aircraft Operations:			
Air Carrier	274,000	352,000	440,000
Cargo	49,000	67,000	81,000
General Aviation	18,000	27,000	39,000
Total Aircraft Operations	341,000	446,000	560,000
Annual Itinerant Operations (Total)	341,000	446,000	560,000
Annual Itinerant Operations by Existing Critical Design Aircraft (B747-400)	3,562	4,400	4,400
Annual Itinerant Operations by Existing and Future Critical Design Aircraft (A380)	--	3,520	7,920
Based Aircraft	28	38	52
Annual Instrument Operations	335,000	438,000	550,000

NOTE:

1/ In 2015, scheduled A380 operations exceed 500 annual operations and, therefore, this aircraft becomes the existing and future critical aircraft at MIA.

SOURCES: *Ricondo & Associates, Inc., Strategic Airport Master Planning Study Baseline Aviation Activity Forecasts,* June 2011; *Ricondo & Associates, Inc., SMP General Aviation Forecasts*, March 2012; Miami Dade Aviation Department, Aircraft Noise Monitoring System FY 2009; Ricondo & Associates, Inc., November 2015.

PREPARED BY: Ricondo & Associates, Inc., November 2015.

A demand-capacity assessment of the various facilities at MIA was also conducted and future facility requirements were quantified. From the airfield demand-capacity assessment, it was concluded that MIA will have adequate capacity to accommodate demand forecast beyond PAL 2 (2035). The MIA passenger terminal will reach its gate and passenger processing capacity prior to PAL 2, while the other aeronautical use facilities, such as cargo; aircraft maintenance, repair, and overhaul (MRO); and fixed base operator (FBO) facilities, will reach capacity prior to PAL 1 (2025).

Using the gross facility requirements derived for MIA, three strategic development options were generated for the Airport. These development scenarios included:

- **Strategic Option #1** – Optimize aeronautical uses within the existing MIA property boundary. This option would not satisfy PAL 2 (2035) demand.
- **Strategic Option #2** – Expand the Airport property envelope through property acquisition to the west and east, but limiting the west acquisition area to NW 72nd Avenue (Milam Dairy Road). By displacing all independent MRO facilities from MIA and encouraging the use of the County's reliever airports (OPF and TMB), this option could satisfy PAL 2 (2035) demand.
- **Strategic Option #3** - Expand the Airport property envelope through property acquisition to the west and east, but limiting the west acquisition area to State Road 826 (Palmetto Expressway) as shown on the existing ALP for MIA. This option could satisfy demand beyond PAL 2 (2035).

The Future ALP carries over the proposed land acquisition from the current ALP drawing for MIA and incorporates consideration for Strategic Option #2. Because of current land constraints at MIA, this option provides consideration for potential property acquisition to both the west and east. The western acquisition area includes approximately 230 acres to NW 72nd Avenue (Milam Dairy Road) and would serve future cargo facility expansion. An additional 60 acres of property immediately east of the Miami Intermodal Center may also be acquired, and could serve as an extension of a variety of landside functions, including remote public and employee parking, taxicab staging, and/or a cell phone waiting lot. Although these planned acquisition areas would allow expansion of the capacity of existing Airport facilities, the ability to serve future demand would still be constrained, therefore inhibiting the ability of the Airport to serve PAL 2 (2035) demand. On that basis, MDAD is exploring opportunities to serve some of the PAL 2 demand, particularly for general aviation and MRO operations, at the general aviation airports within the Miami-Dade County system of airports or through the acquisition of additional property west of NW 72nd Avenue.

In addition to the potential acquisition of adjacent properties, the Future ALP for MIA incorporates consideration of the following capital improvements:

- Modifications to Taxiways P, Q, R, and T5
- Redevelopment and expansion of portions of the existing passenger terminal and adjacent areas, including remote aircraft parking/hardstand positions
- Construction of onsite parking garages to serve both public and employee parking demands
- Relocation of the taxicab holding lot
- Construction of a centralized cell phone waiting lot along NW 21st Street immediately east of Le Jeune Road
- Redevelopment and expansion of cargo facilities to the west of Runway 12-30
- Redevelopment of some of the older MRO facilities along NW 36th Street
- Expansion of the fuel farm
- Relocation and expansion of ground service equipment (GSE) storage and maintenance facilities
- Relocation of the cargo clearance center
- Partial closure of Perimeter Road (north of the Southeast Gate)

For capital planning purposes, the facility and infrastructure development initiatives associated with the preferred development scenario were categorized into one of four development phases. Each phase reflects a 5-year period, as follows:

- Phase 1 (2016 - 2020)
- Phase 2 (2021 – 2025)
- Phase 3 (2026 – 2030)
- Phase 4 (2031 – 2035)

Table A-3 presents the total implementation costs for various property acquisition and capital improvement identified in the SMP for MIA. These projects are summarized in accordance with the four development phases and by general project categories.

Table A-3: Miami International Airport - Capital Improvement Needs by Phase (2014 Dollars)

DESCRIPTION	PHASE 1	PHASE 2	PHASE 3	PHASE 4	TOTAL
Property Acquisition	$45,580,000	$466,552,000	$40,128,000	$13,780,000	$566,040,000
Enabling Projects [1/]	$82,492,000	$118,388,000	$124,311,000	$43,903,000	$369,094,000
Airfield Modifications [2/]	$38,676,633	$-	$-	$3,808,000	$42,053,000
Terminal Improvements	$265,771,000	$708,000,000	$825,168,000	$ 825,168,000	$2,624,407,000
Landside Improvements	$222,181,000	$-	$12,908,000	$-	$235,089,000
Cargo Facilities	$56,619,405	$368,181,000	$317,837,000	$53,760,000	$796,397,000
Aviation Support Facilities	$156,709,000	$56,373,000	$8,000,000	$8,000,000	$229,082,000
MRO Facilities [3/]	$-	$-	$-	$-	$-
Total	**$867,597,000**	**$1,717,794,000**	**$1,328,352,000**	**$948,419,000**	**$4,862,162,000**

NOTES:

1/ Enabling projects are reflective of the demolition and site preparation activities associated with acquired properties.

2/ The costs associated with the Taxiway R realignment are pending the preparation of cost estimates by RIB U.S. Cost, Inc.

3/ Aircraft Maintenance, Repair and Overhaul (MRO) facilities to be funded by a third party developer.

SOURCES: URS Corporation, Construction Costs, April 2014; MIA Taxi Lot Relocation Project Book, TYLyn International, Inc., July 2015; RIB U.S. Cost, Inc., September 2015; Ricondo & Associates, Inc., SMP Technical Analyses, November 2012 through August, 2014.

PREPARED BY: Ricondo & Associates, Inc., November 2015.

To clearly present the existing conditions and recommended Airport improvements, the ALP set includes a number of individual drawing sheets. The Future ALP sheet is essential in the process of applying for federal or state funding assistance for any individual development project and also serves as the mechanism for projects to undergo FAA airspace review. For MIA, the ALP set is presented on the following drawing sheets:

- Title Sheet (Sheet 1 of 25)
- Airport Data Sheet (Sheet 2 of 25)
- Existing Airport Layout Plan (Sheet 3 of 25)

- Future Airport Layout Plan (Sheet 4 of 25)
- Future Terminal Area Layout (Sheet 5 of 25)
- Airport Airspace Plan - Part 77 West (Sheet 6 of 25)
- Airport Airspace Plan - Part 77 East (Sheet 7 of 25)
- Airport Airspace Plan & Profile (1 of 2) (Sheet 8 of 25)
- Airport Airspace Plan & Profile (2 of 2) (Sheet 9 of 25)
- Runway Centerline Profiles (Sheet 10 of 25)
- Runway 8L Inner Approach Surfaces (Sheet 11 of 25)
- Runway 26R Inner Approach Surfaces (Sheet 12 of 25)
- Runway 8R Inner Approach Surfaces (Sheet 13 of 25)
- Runway 26L Inner Approach Surfaces (Sheet 14 of 25)
- Runway 8L-26R and 8R-26L Departure Surfaces (Sheet 15 of 25)
- Runway 12 Inner Approach Surfaces (Sheet 16 of 25)
- Runway 30 Inner Approach Surfaces (Sheet 17 of 25)
- Runway 9 Inner Approach Surfaces (Sheet 18 of 25)
- Runway 27 Inner Approach Surfaces (Sheet 19 of 25)
- Runway 12-30 and 9-27 Departure Surfaces (Sheet 20 of 25)
- On-Airport Land Use Plan (Sheet 21 of 25)
- Off-Airport Land Use Plan (Sheet 22 of 25)
- Airport Property Map (Sheet 23 of 25)
- Airport Property Legal Description (1 of 2) (Sheet 24 of 25)
- Airport Property Legal Description (2 of 2) (Sheet 25 of 25)

Reduced reproductions of these drawings are included in **Appendix B** of this report for illustration purposes. A full-size set of the drawings is also being submitted along with this report to the FAA and FDOT for review and acceptance.

B. Basic Aeronautical Forecasts

The aeronautical forecasts serve as a basis for future master planning, considering the unique cargo and passenger activity characteristics of the Airport. This section presents the baseline aeronautical forecasts intended to be used for planning analyses discussed in the SMP. The forecasts address the activity expected over the 20-year planning horizon (through 2035).

MDAD has an annual forecast report prepared by its Traffic Engineers titled *'Report of the Traffic Engineers"*. The July 22, 2010 was the most current annual forecast report available at the time the SMP forecast were prepared, and include short-term aeronautical forecast through 2018. The SMP enplaned passenger forecasts were prepared based on a review and assessment of the *Report of the Traffic Engineers* dated July 22, 2010, and the forecasts were extended beyond 2018. The *Report of the Traffic Engineers* does not forecast air carrier operations or cargo-related activity (tonnage and all-cargo carrier operations).

An *SMP Baseline Aviation Activity Forecasts* (Aeronautical Forecast) report was developed for MDAD in 2011 and the forecasts were subsequently approved by the FAA on July 21, 2011. The baseline forecasts for MIA include enplaned passengers, aircraft operations, aircraft fleet mix, and derivative forecasts for the peak month and peak month average day. The forecast analysis was focused on air carrier (passenger) and air cargo traffic. Subsequently, in 2012, a separate report, *General Aviation Activity Forecasts,* was prepared for MIA and the County's four general aviation airports, which included forecasts of aircraft operations, based aircraft, and derivative forecasts. The FAA approval letters for both forecasts are included in **Appendix C** of this document. The findings from these two reports are summarized below. The general aviation activity forecast was not part of the SMP Baseline Aeronautical Forecast.

The following three documents were reviewed to provide a basis for the enplaned passenger forecasts, as well as for comparison of the results:

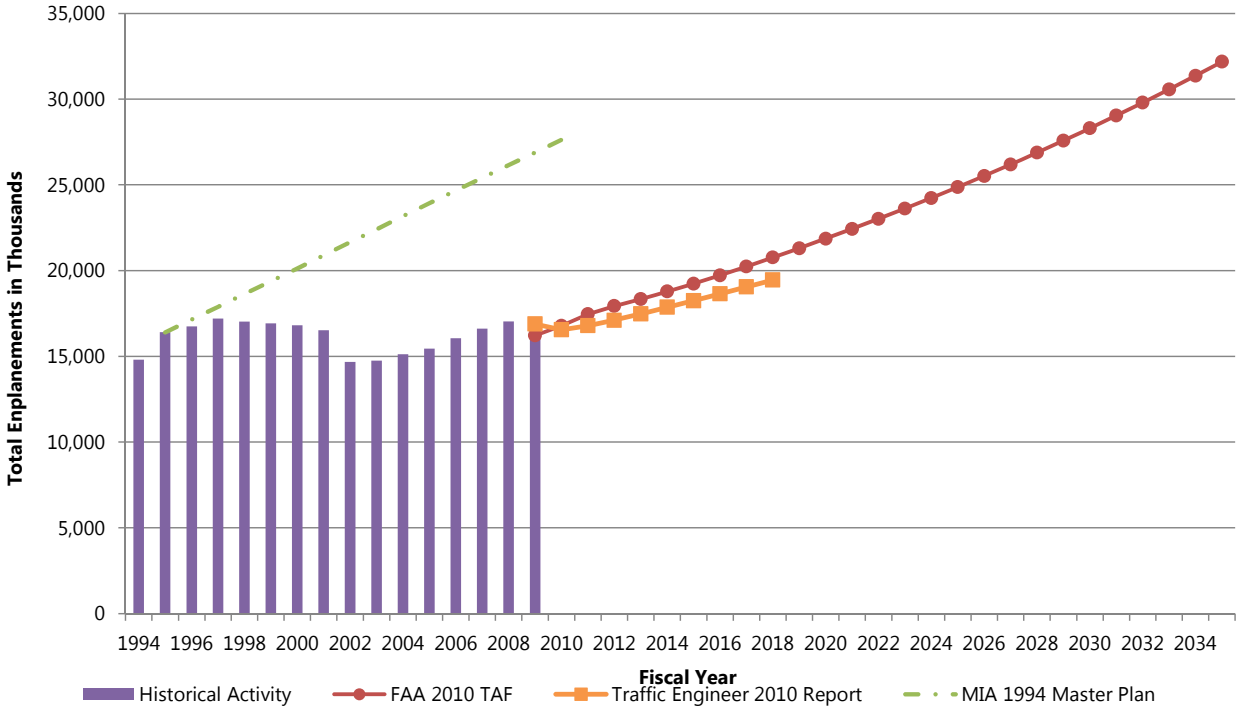
- The 1994 *Airport Master Plan*, which included a long-term forecast for MIA
- The final *Report of the Traffic Engineers* prepared by Jacobs Consultancy for MDAD in July 22, 2010
- The FAA 2010 Terminal Area Forecasts (TAF) for MIA

Exhibit B-1 presents a comparison of the three available enplaned passenger forecasts for 2009 through 2035. The *Report of the Traffic Engineers* does not provide forecasts of annual aircraft operations. **Exhibit B-2** presents the two available aircraft operations forecasts.

For purposes of this analysis, the effects of the recent economic downturn on air traffic activity were expected to stabilize by 2013. In addition, American Airlines was assumed to remain the major airline at MIA. Fuel price volatility and availability were not considered to be constraining factors over the planning horizon.

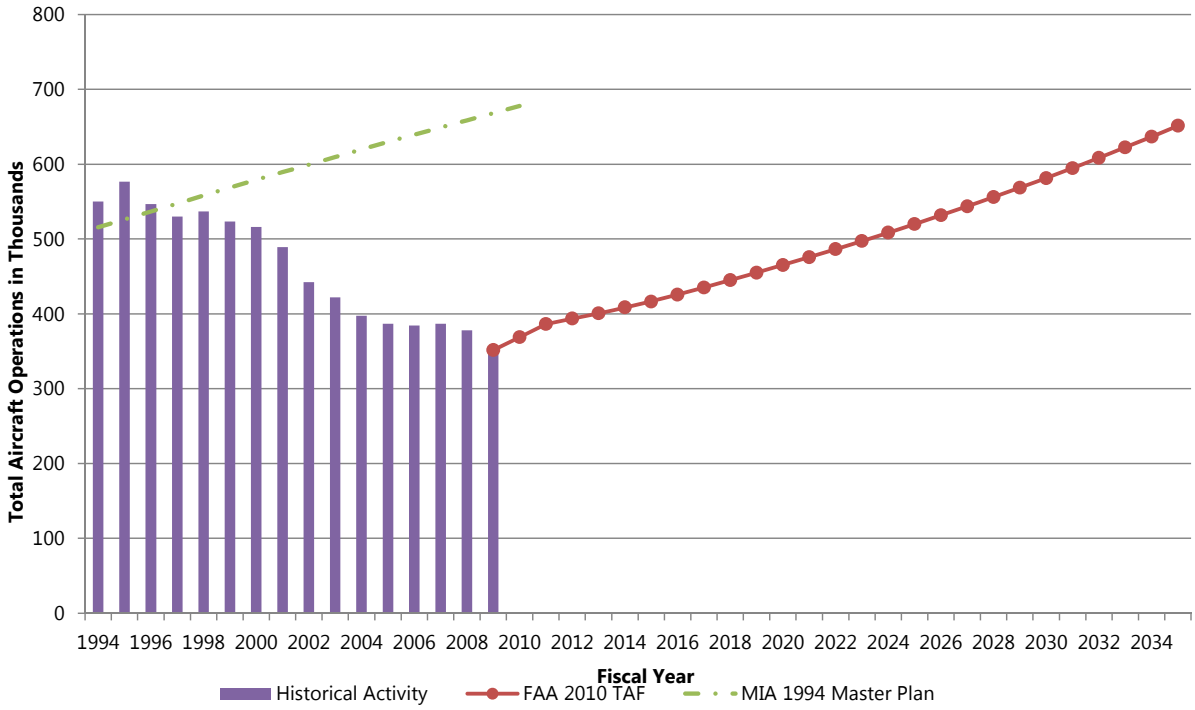
To the extent possible, data are presented for fiscal years (FYs) starting on October 1 and ending on September 30 of the following year. For instance, FY 2013 began on October 1, 2012, and ended on September 30, 2013.

Exhibit B-1: Miami International Airport – Comparison of Enplaned Passenger Forecasts



SOURCES: Jacobs Consultancy Inc., *Final Report of the Traffic Engineers*, July 22, 2010; Landrum & Brown, *Master Plan Update*, 1994; 2010 Federal Aviation Administration, *Terminal Area Forecast,* December 2010.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

Exhibit B-2: Miami International Airport – Comparative Aircraft Operations Forecasts

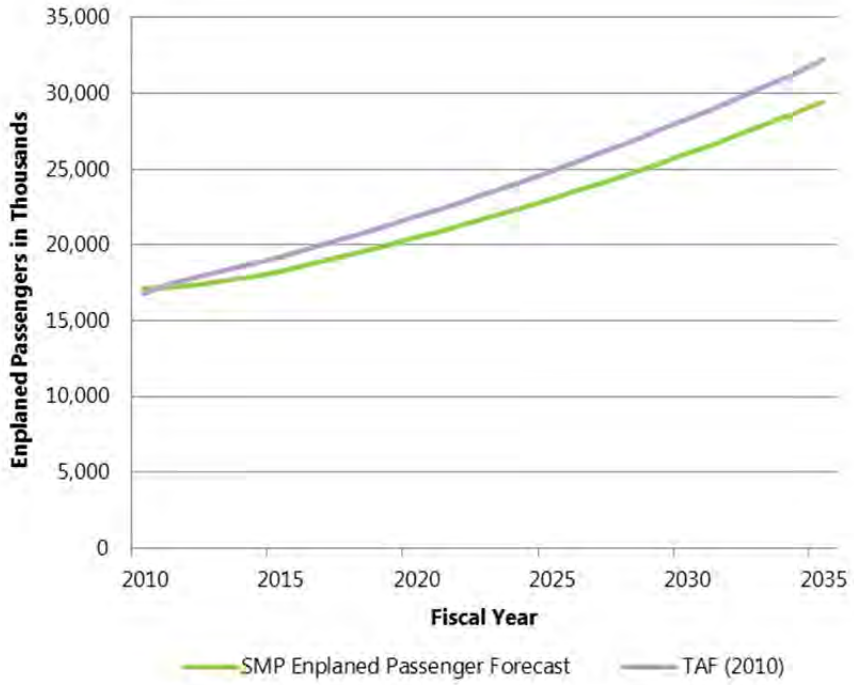


SOURCES: Landrum & Brown, Master Plan Update, 1994; Federal Aviation Administration, *Terminal Area Forecast*, December 2010.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

B.1 Enplaned Passengers

Total projections of enplaned passengers were derived by summing the projections of originating and connecting passengers. The forecasts of Origin and Destination (O&D) passengers were generated using regression analysis. In the near-term forecasts, it was assumed that the numbers of originating passengers would increase 0.5 percent, 0.75 percent, and 1.0 percent in 2010, 2011, and 2012, respectively. Between 2012 and 2017, the rate of increase accelerates to the long-term average growth rate of 2.3 percent. Connecting traffic at MIA is primarily generated by American Airlines, American Eagle, and their foreign-flag alliance partners. Their operations, and MIA's position as a gateway to Latin America and the Caribbean, are not anticipated to change considerably and it was assumed that American Airlines and American Eagle would continue operating at MIA in a similar manner over the 20 year planning horizon. Forecasts of connecting passengers were derived from the numbers of originating passengers under the assumption that the O&D share of enplaned passengers at MIA would decrease to 52 percent by 2035. The resulting forecasts of enplaned passengers are summarized on **Exhibit B-3**.

Exhibit B-3: Miami International Airport - Forecast Enplaned Passengers



FISCAL YEAR	MIA SMP ENPLANED PASSENGER FORECAST	FAA TERMINAL AREA FORECAST (2010)
2009 (Actual)	17,027,000	16,214,070
2015	18,280,000	19,226,211
2020	20,461,000	21,859,331
2025 (PAL 1)	23,037,000	24,866,469
2035 (PAL 2)	29,460,000	32,178,156

NOTES:

Fiscal Year (FY) 2009 was the latest year for which complete data were available at the time the forecasts were developed and was used as the base year.

The County's Fiscal Year = October 1 through September 30.

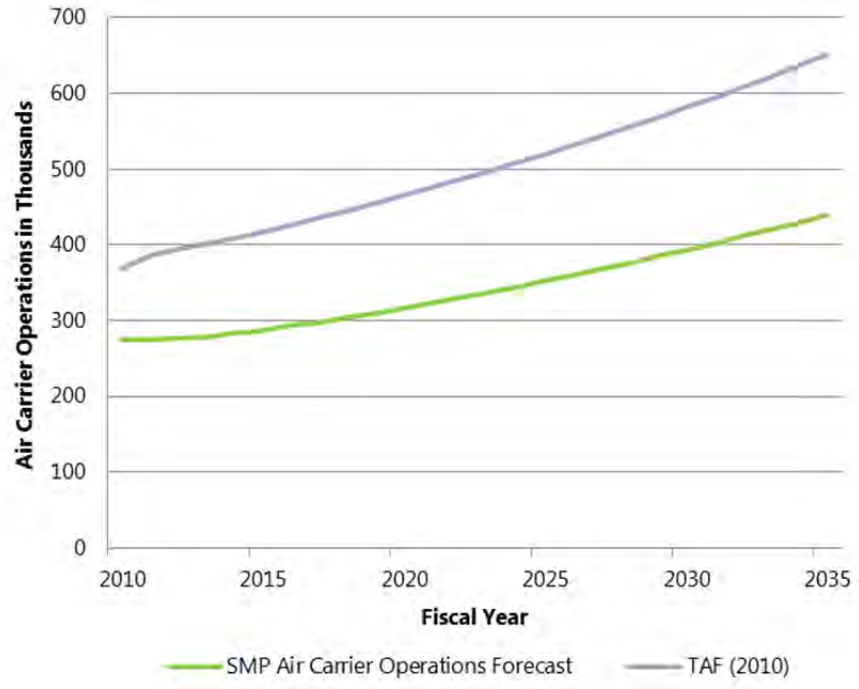
SOURCE: Ricondo & Associates, Inc., *Strategic Airport Master Planning Study Baseline Aviation Activity Forecasts,* June 2011.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

B.2 Aircraft Operations

Annual aircraft operations at MIA are a combination of air carrier, cargo, and general aviation aircraft operations. For the SMP forecasts, air carrier aircraft operations were derived from the forecasts of enplaned passengers by using the average number of seats per departure and load factor metrics as key variables. A similar analysis was performed to calculate all-cargo aircraft operations based on the cargo tonnage forecast. The MIA SMP forecast did not include the development of general aviation aircraft operations forecasts. The general aviation forecasts were developed as part of the SMPs General Aviation Activity Forecasts task, which was finalized in June 2012 and the forecasts were subsequently approved by the FAA in August 2012. The FAA approval letter is included in Appendix C of this document.

Exhibit B-4 illustrates the SMP forecasts of air carrier aircraft operations at MIA through PAL 2 (2035). The SMP forecasts are more conservative than the TAF for MIA primarily because of the slower recovery from the recession assumed in the SMP's baseline forecast. The total annual air carrier aircraft operations at MIA are forecast to increase from 274,000 in FY 2009 to 352,000 in PAL 1 and to 440,000 in PAL 2.

Exhibit B-4: Miami International Airport – Total Forecast Air Carrier Aircraft Operations



FISCAL YEAR	MIA SMP AIR CARRIER OPERATIONS FORECAST	FAA TERMINAL AREA FORECAST (2010)
2009 (Actual)	274,000	351,427
2015	287,000	416,410
2020	316,000	465,206
2025 (PAL 1)	352,000	519,936
2035 (PAL 2)	440,000	651,325

NOTES:

FY 2009 was the latest year for which complete data were available at the time the forecasts were developed and was used as the base year.

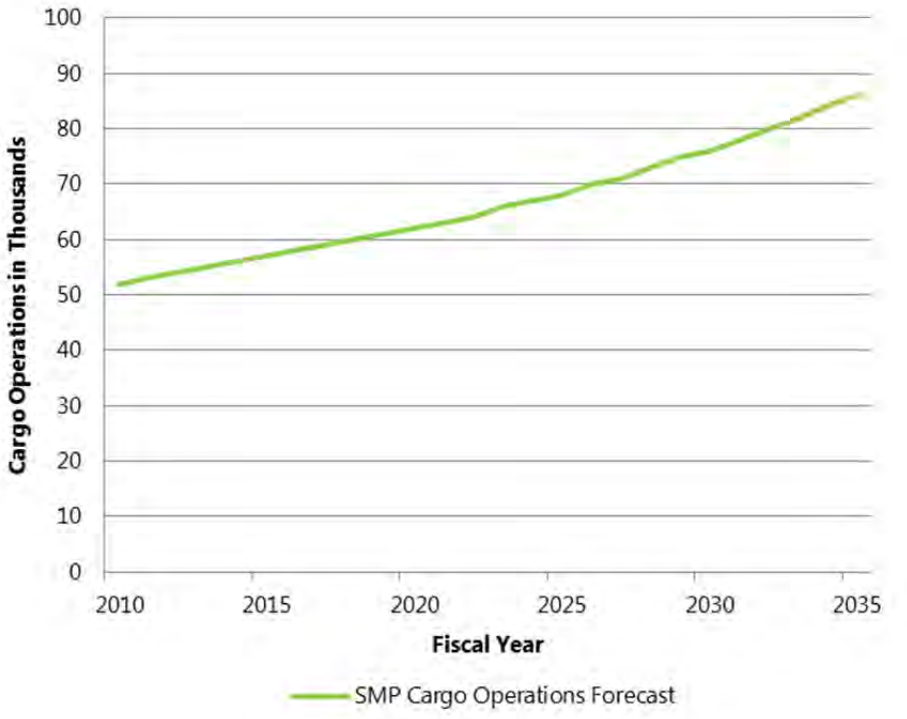
The County's Fiscal Year = October 1 through September 30.

SOURCE: Ricondo & Associates, Inc., *Strategic Airport Master Planning Study Baseline Aviation Activity Forecasts*, June 2011
PREPARED BY: Ricondo & Associates, Inc., November 2015.

Exhibit B-5 illustrates the SMP forecasts of all-cargo aircraft operations at MIA. The operations by all-cargo carriers were derived from the forecast cargo tonnage. The process required preserving the separation of domestic and international cargo weight as the forecast growth rates and market shares of cargo carried by freighters are different for domestic and international markets. In addition, the payloads of the aircraft used on domestic and international cargo flights differ significantly. The tonnage was converted into an average

daily weight using an assumed 312 work days annually. The inbound and outbound cargo loads at MIA are not balanced, as is usually the case for an international gateway. Total cargo consists of inbound and outbound cargo, but the need for aircraft operations is driven by one-way demand. A multiplier of 0.60 was used to determine unidirectional cargo weight. To compensate for belly cargo carried by the passenger airlines, domestic tonnage was reduced by 20 percent and international tonnage was reduced 15 percent to reflect MIA averages. The final step in deriving all-cargo aircraft operations from cargo tonnage consists of selecting the types of freighters and the average payloads available to transport cargo. The total annual all-cargo aircraft operations at MIA are forecast to increase from 49,000 in FY 2009 to 67,800 in PAL 1 and to 86,000 in PAL 2.

Exhibit B-5: Miami International Airport – Total Forecast All-Cargo Aircraft Operations



FISCAL YEAR	MIA SMP CARGO OPERATIONS FORECAST
2009 (Actual)	49,000
2015	57,000
2020	62,000
2025 (PAL 1)	67,800
2035 (PAL 2)	86,000

NOTES:

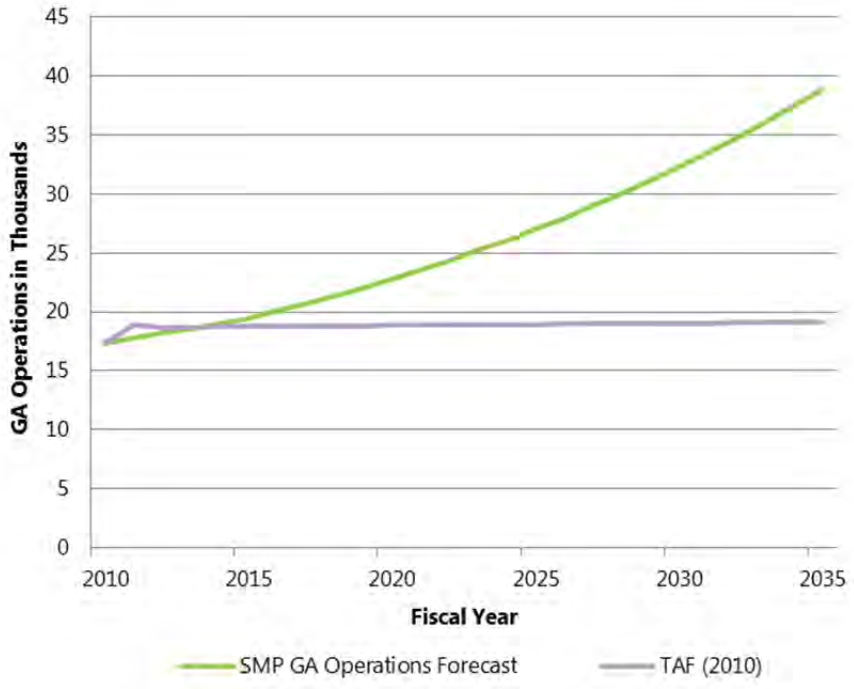
FY 2009 was the latest year for which complete data were available at the time the forecasts were developed and was used as the base year.

The County's Fiscal Year = October 1 through September 30.

SOURCE: Ricondo & Associates, Inc., *Strategic Airport Master Planning Study Baseline Aviation Activity Forecasts,* June 2011
PREPARED BY: Ricondo & Associates, Inc., November 2015.

As presented on **Exhibit B-6**, total annual general aviation (GA) aircraft operations at MIA are forecast to increase from 17,374 in FY 2009 to 27,000 in PAL 1 and to 39,000 in PAL 2. The FAA TAF for general aviation operations a MIA forecasts an increase from 17,374 in FY 2009 to 19,123 in FY 2035.

Exhibit B-6: Miami International Airport – Total Forecast General Aviation Aircraft Operations



FISCAL YEAR	MIA SMP GENERAL AVIATION OPERATIONS FORECAST	FAA TERMINAL AREA FORECAST (2010)
2010 (Actual) 1/	17,374	17,374
2015	19,500	18,742
2020	22,800	18,837
2025 (PAL 1)	27,000	18,932
2035 (PAL 2)	39,000	19,123

NOTES:

1/ The MIA SMP general aviation operations forecast which was prepared subsequent to the other SMP forecasts relied upon FY 2010 as the most current data set for the historical activity.

FY 2009 was the latest year for which complete data were available at the time the forecasts were developed and was used as the base year.

The County's Fiscal Year = October 1 through September 30.

SOURCES: URS Corporation, *SMP General Aviation Forecasts*, March 2012; Federal Aviation Administration, *Terminal Area Forecast*, January 2012.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

Table B-1 summarizes total annual aircraft operations at MIA, which are forecast to increase at an average annual compound growth rate (AACGR) of 2.01 percent.

Table B-1: Miami International Airport – Total Forecast Aircraft Operations

FISCAL YEAR	MIA SMP AIR CARRIER OPERATIONS FORECAST	MIA SMP CARGO OPERATIONS FORECAST	MIA SMP GENERAL AVIATION OPERATIONS FORECAST	TOTAL FORECAST AIRCRAFT OPERATIONS
2009 (Actual)	274,000	49,000	17,374	341,000
2015	287,000	57,000	19,500	363,500
2020	316,000	62,000	22,800	400,800
2025 (PAL 1)	352,000	67,000	27,000	446,000
2035 (PAL 2)	440,000	81,000	39,000	560,000
AACGR (2009 – 2035)	1.9%	2.0%	3.3%	2.0%

NOTES:

FY 2009 was the latest year for which complete data were available at the time the forecasts were developed and was used as the base year.

The County's Fiscal Year = October 1 through September 30.

AACGR = Average Annual Compound Growth Rate

SOURCES: Ricondo & Associates, Inc., *Strategic Airport Master Planning Study Baseline Aviation Activity Forecasts*, June 2011; URS Corporation, *SMP General Aviation Forecasts*, March 2012.

PREPARED BY: Ricondo & Associates, Inc., September 2015.

B.3 Total Itinerant Operations

Currently, no local aircraft operations are conducted at MIA. Local operations are those performed by aircraft that remain in the local traffic pattern, execute simulated instrument approaches or low passes at the airport, and conducted to or from the airport and a designated practice area within a 20−mile radius of the airport traffic control tower (ATCT). All operations at MIA are considered itinerant operations.

B.4 Itinerant Operations by Current Critical Aircraft

In 2009, the B747-400 was the critical aircraft at MIA and accounted for 3,562 operations. In 2014, however, Air France became the second airline at MIA to operate the A380-800 with seasonal daily flights between November and March. Coupled with the ongoing daily A380 operations conducted by Lufthansa, aircraft utilization surpassed 500 annual operations at MIA in FY 2014. In accordance with projected flight schedules for these two airlines, 1,030 operations by the A380-800 are anticipated during FY 2015. The growth in annual itinerant operations by the current critical aircraft was calculated by applying the growth in the aircraft fleet mix to the growth in total A380 aircraft operations. For the A380-800 (400 and more seats) the projected share of total air carrier aircraft operations at MIA ranges from 0.6 percent in FY 2020 to 1.8 percent in FY 2035. **Table B-2** lists itinerant operations at MIA by the current critical aircraft. These operations are expected to increase from 1,030 in FY 2015 to 3,520 in PAL 1 and to 7,920 in PAL 2.

Table B-2: Miami International Airport – Total Itinerant Aircraft Operations by the Critical Aircraft

FISCAL YEAR	ITINERANT OPERATIONS BY CRITICAL AIRCRAFT [1/]	SHARE (PERCENT) OF OVERALL AIR CARRIER AIRCRAFT FLEET MIX
2010	--	--%
2015	1,030 (scheduled)	0.2%
2020	2,358	0.6%
2025 (PAL 1)	3,520	1.0%
2035 (PAL 2)	7,920	1.8%

NOTE:

The County's Fiscal Year = October 1 through September 30.

SOURCE: Ricondo & Associates, Inc., *Strategic Airport Master Planning Study Baseline Aviation Activity Forecasts*, June 2011.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

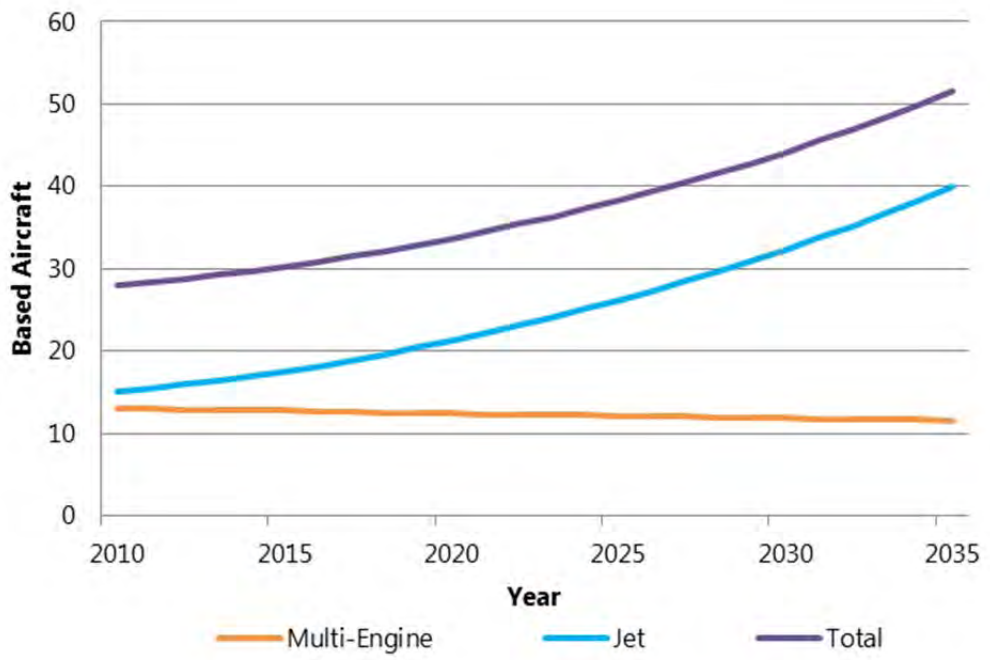
B.5 Itinerant Operations by Future Critical Aircraft

An evaluation of the future aircraft fleet mix did not identify a more demanding aircraft that would be likely to exceed 500 annual operations at MIA during the planning horizon. Therefore, the A380-800 is expected to remain the critical aircraft at MIA through PAL 2. The total annual itinerant operations by the future critical aircraft will be the same as that of the current critical aircraft, as shown in Table B-2.

B.6 Based Aircraft

The forecasts of based aircraft at MIA are presented on **Exhibit B-7**. Using information and data provided by MDAD, an inventory of the numbers and types of aircraft permanently based at MIA was developed and analyzed. Using these data, forecasts of based aircraft by type were developed by referencing the *FAA Aerospace Forecasts, FY 2012-2032*, Table 28, "Active General Aviation and Air Taxi Aircraft."

Exhibit B-7: Miami International Airport - Forecasts of Based Aircraft



FISCAL YEAR	MULTI-ENGINE	JET	TOTAL
2010	13	15	28
2015	13	17	30
2020	12	21	34
2035	12	40	52
AACGR (2010 – 2035)	-0.3%	4.0%	2.5%

NOTES:

The County's Fiscal year = October 1 through September 30.

AACGR = Average Annual Compound Growth Rate

SOURCES: URS Corporation, *SMP General Aviation Forecasts*, March 2012; Miami-Dade Aviation Department, January 2012.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

B.7 Instrument Approaches

The ATCT at MIA is open 24 hours a day and records aircraft operations. The FAA's Air Traffic Activity Data System (ATADS) was used to access the historical annual itinerant instrument approaches into MIA. In FY 2009, 98.2 percent of total operations at MIA were instrument operations. It is anticipated that this trend will remain constant over the planning horizon. At this rate, annual itinerant instrument approaches are expected to increase from 338,900 in FY 2010 to 531,400 in FY 2035. **Table B-3** presents total annual itinerant instrument operations at MIA.

Table B-3: Miami International Airport – Total Itinerant Instrument Approaches by All Aircraft Types

FISCAL YEAR	TOTAL ANNUAL OPERATIONS FORECAST	ANNUAL ITINERANT INSTRUMENT APPROACHES BY ALL AIRCRAFT
2010	343,400	337,800
2015	363,500	357,000
2020	400,800	393,600
2025 (PAL 1)	446,000	438,000
2035 (PAL 2)	560,000	550,000

SOURCES: Federal Aviation Administration, *Terminal Area Forecast*, December 2010; Federal Aviation Administration, Air Traffic Activity Data System, September 2015.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

B.8 Critical Aircraft

The current critical aircraft at MIA is the A380-800 (400 and more seats) with 1,030 scheduled operations in FY 2015. It is anticipated that this aircraft would remain the critical aircraft throughout the planning horizon.

B.9 Runway Design Code

The Runway Design Code (RDC) is a coding system described in FAA AC 150/5300-13A (Change 1), *Airport Design*, as the basis for specifying applicable runway design standards. The intent of the RDC is to provide a simple method for compiling the numerous dimensional and performance specifications of aircraft operating at or expected to operate at an airport, into criteria that define the dimensional and design standards for a given runway. The RDC consists of three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and approach visibility minimums.

MIA has four air carrier aircraft runways, consisting of three parallel east-west Runways (8L-26R, 9-27, and 8R-26L and crosswind Runway 12-30. The following describes the RDC for each runway end.

B.9.1 RUNWAY 8L-26R

- Aircraft Approach Category – From an approach speed standpoint, the Boeing 747-400 is the critical aircraft; this aircraft falls within the AAC D. It is anticipated that the AAC for this runway will remain the same in the future.
- Airplane Design Group – Based on wingspan, the Boeing 747-400 is the critical aircraft; this aircraft falls within ADG V. The ADG for this runway will remain the same in the future.
- Visibility Minimums – The Runway 8L end provides a visibility minimum of 1.0 statute mile (5,000 feet Runway Visual Range). The Runway 26R end provides a visibility minimum of 7/8 statute mile (4,000 feet Runway Visual Range). The visibility minimums for Runway 8L-26R will remain the same in the future.

B.9.2 RUNWAY 8R-26L

- Aircraft Approach Category – From an approach speed standpoint, the Boeing 747-400 is the critical aircraft; this aircraft falls within AAC D. It is anticipated that the AAC for this runway will remain the same in the future.
- Airplane Design Group – Based on wingspan, the B747-400 is the critical aircraft; this aircraft falls within ADG V. Designated as the contingency runway for A380 operations, it is anticipated that the ADG for this runway will be increased to ADG VI during the 20-year planning horizon.
- Visibility Minimums – The Runway 8R end provides a visibility minimum of a 1/2 statute mile (2,400 feet Runway Visual Range). The Runway 26L end provides a visibility minimum of a 3/4 statute mile (4,000 feet Runway Visual Range). The visibility minimums for Runway 26L will remain the same in the future. For Runway 8R the visibility minimums will change to 1,800 feet Runway Visual Range with a Category (CAT) II special authorization.

B.9.3 RUNWAY 9-27

- Aircraft Approach Category – From an approach speed standpoint, the A380-800 is the critical aircraft; this aircraft falls within AAC D. It is anticipated that the AAC for this runway will remain the same in the future.
- Airplane Design Group – Based on wingspan, the A380-800 is the critical aircraft; this aircraft falls within ADG VI. It is anticipated that the ADG for this runway will remain the same in the future.
- Visibility Minimums – Runway 9-27 provides a visibility minimum of 1/2 statute mile (2,400 feet Runway Visual Range). For Runways 9 and 27 the visibility minimums will change to 1,800 feet Runway Visual Range with a Category (CAT) II special authorization.

B.9.4 RUNWAY 12-30 (FUTURE 13-31)

- Aircraft Approach Category – From an approach speed standpoint, the Boeing 747-400 is the critical aircraft; this aircraft falls within AAC D. It is anticipated that the AAC for this runway will remain the same in the future.
- Airplane Design Group – Based on wingspan, the Boeing 747-400 is the critical aircraft; this aircraft falls within ADG V. The ADG for this runway will remain the same in the future.
- Visibility Minimums – Runway 12-30 provides a visibility minimum of 3/4 statute mile (4,000 feet Runway Visual Range). The visibility minimums for Runway 12-30 (future Runway 13-31) will remain the same in the future.

The RDCs for the runways at MIA are summarized in **Table B-4**. As shown, the existing Airport Reference Code (ARC) is designated as D-VI and will remain unchanged through PAL 2 (2035).

Table B-4: Miami International Airport – Runway Design Codes

	AIRCRAFT APPROACH CATEGORY		AIRPLANE DESIGN GROUP		VISIBILITY MINIMUM (FEET)		RUNWAY DESIGN CODE	
RUNWAY	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
8L	D	Same	V	Same	5,000	Same	D/V/5,000'	Same
26R	D	Same	V	Same	4,000	Same	D/V/4,000'	Same
8R	D	Same	V 1/	VI	2,400	1,800 RVR 2/	D/V/2,400'	D/VI/1,800'
26L	D	Same	V 1/	VI	4,000	Same	D/V/4,000'	D/VI/4,000'
9	D	Same	V 1/	VI	2,400	1,800 RVR 2/	D/V/2,400'	D/VI/1,800'
27	D	Same	V 1/	VI	2,400	1,800 RVR 2/	D/V/2,400'	D/VI/1,800'
12 (13)	D	Same	V	Same	4,000	Same	D/V/4,000'	Same
30 (31)	D	Same	V	Same	4,000	Same	D/V/4,000'	Same

NOTE:

1/ Runways 8R-26L and 9-27 at Miami International Airport (MIA) have been approved for A380 operations with operational limitations and modification to standards. The future ALP for MIA provides consideration for reconfiguring these two Runways to satisfy Airplane Design Group VI standards.

2/ The visibility minimums will change to 1,800 feet Runway Visual Range with a Category II special authorization.

SOURCE: Ricondo & Associates, Inc., November 2015.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

B.10 Runway Reference Code

The Runway Reference Code (RRC) or the Approach and Departure Reference Codes (APRC and DPRC) describe the current operational capabilities of a runway and adjacent taxiways where no special operating procedures are necessary. The APRC consists of the same three parameters as the RDC (AAC, ADG, and visibility minimums), whereas the DPRC consists of the AAC and ADG only. The APRC and DPRC coding system is set forth in FAA AC 150/5300-13A (Change 1), *Airport Design*. The APRC and DPRC differ from the RDC, as the RDC is based on planned development and has no operational application. The APRC and DPRC may change over time as improvements are made to the runway, taxiway, and navigational aids.

The APRC is determined based on the existing runway-to-taxiway separation and visibility minimums. At MIA, the runway centerline separations from their associated full length parallel taxiway centerlines vary between 350 feet and 524 feet (Runway 8L-26R, 400 feet; Runway 8R-26L, 400 feet; Runway 9-27, varies from 400 feet to 524 feet, and Runway 12-30, varies from 350 feet to 400 feet). The runway-to-taxiway separation combined with the visibility minimums presented herein result in an APRC of D/V/5,000' for Runway 8L, D/V/4,000' for Runways 26R, 26L, 12, and 30, and D/V/2,400' for Runways 8R, 9, and 27. The future APRCs associated with Runways 8L-26R and 12-30 will remain the same, while the APRC for Runways 8R-26L and 9-27 will increase to satisfy ADG VI standards.

The DPRC is determined based on the existing runway-to-taxiway separation. With separations between the runway centerlines and their associated full length parallel taxiway centerlines identified above, the existing and future DPRC for all runways is D/IV – D/V. **Table B-5** summarizes the APRCs and DPRCs for MIA.

Table B-5: Miami International Airport – Approach and Departure Reference Codes

	APPROACH REFERENCE CODE		DEPARTURE REFERENCE CODE	
RUNWAY	**EXISTING**	**FUTURE**	**EXISTING**	**FUTURE**
8L	D/V/5,000'	Same	D/IV - D/V	Same
26R	D/V/4,000'	Same	D/IV - D/V	Same
8R	D/V/2,400'	D/VI/2,400'	D/IV - D/V	Same
26L	D/V/4,000'	D/VI/4,000'	D/IV - D/V	Same
9	D/V/2,400'	D/VI/2,400'	D/IV - D/V	Same
27	D/V/2,400'	D/VI/2,400'	D/IV - D/V	Same
12 (13)	D/V/4,000'	Same	D/IV - D/V	Same
30 (31)	D/V/4,000'	Same	D/IV - D/V	Same

SOURCE: Ricondo & Associates, Inc., November 2015.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

C. Alternatives/Proposed Development

C.1 Proposed Development Items

A demand-capacity assessments of various aeronautical and support facilities at MIA was conducted. The purpose of these assessments was to compare the capacity of existing facilities and infrastructure with current and future demand to determine when additional capital improvements would be required. When deficiencies were identified, future facility requirements were projected and quantified. Future facility and infrastructure improvements depicted on the Future ALP include:

- Airfield modifications
- Passenger terminal expansion and redevelopment
- Remote aircraft parking positions (hardstands)
- Cargo warehouse facilities
- Aircraft maintenance, repair, and overhaul facilities
- Terminal landside improvements
- Aviation support facilities

The demand-capacity assessments help identify the demand at which existing Airport facilities would reach or exceed capacity, thereby triggering the need to expand facilities or reallocate demand to other airports within the County's system of airports.

C.1.1 AIRFIELD

The capacity of the airfield was assessed using the airfield simulation model, SIMMOD Plus. Airspace and terminal gate capacities were not evaluated as part of the airfield simulation. Three demand scenarios were modeled, which included the demand experienced in FY 2009 and that forecast for FY 2035 (PAL 2) and FY 2050 (PAL 3). An average delay per aircraft operation of 7.0 minutes was identified as the maximum tolerable aircraft delay.

The airfield simulations concluded that the average aircraft delay associated with the existing airfield at MIA is expected to increase from 1.1 minutes per aircraft operation at the FY 2009 operational demand level to 28.9 minutes per aircraft operation in PAL 3. The maximum allowable delay of 7.0 minutes per aircraft operation was projected to occur after PAL 2, estimated to occur in FY 2042 when the airport reaches approximately 660,000 annual operations. The hourly airfield capacity throughput was calculated at 146 operations

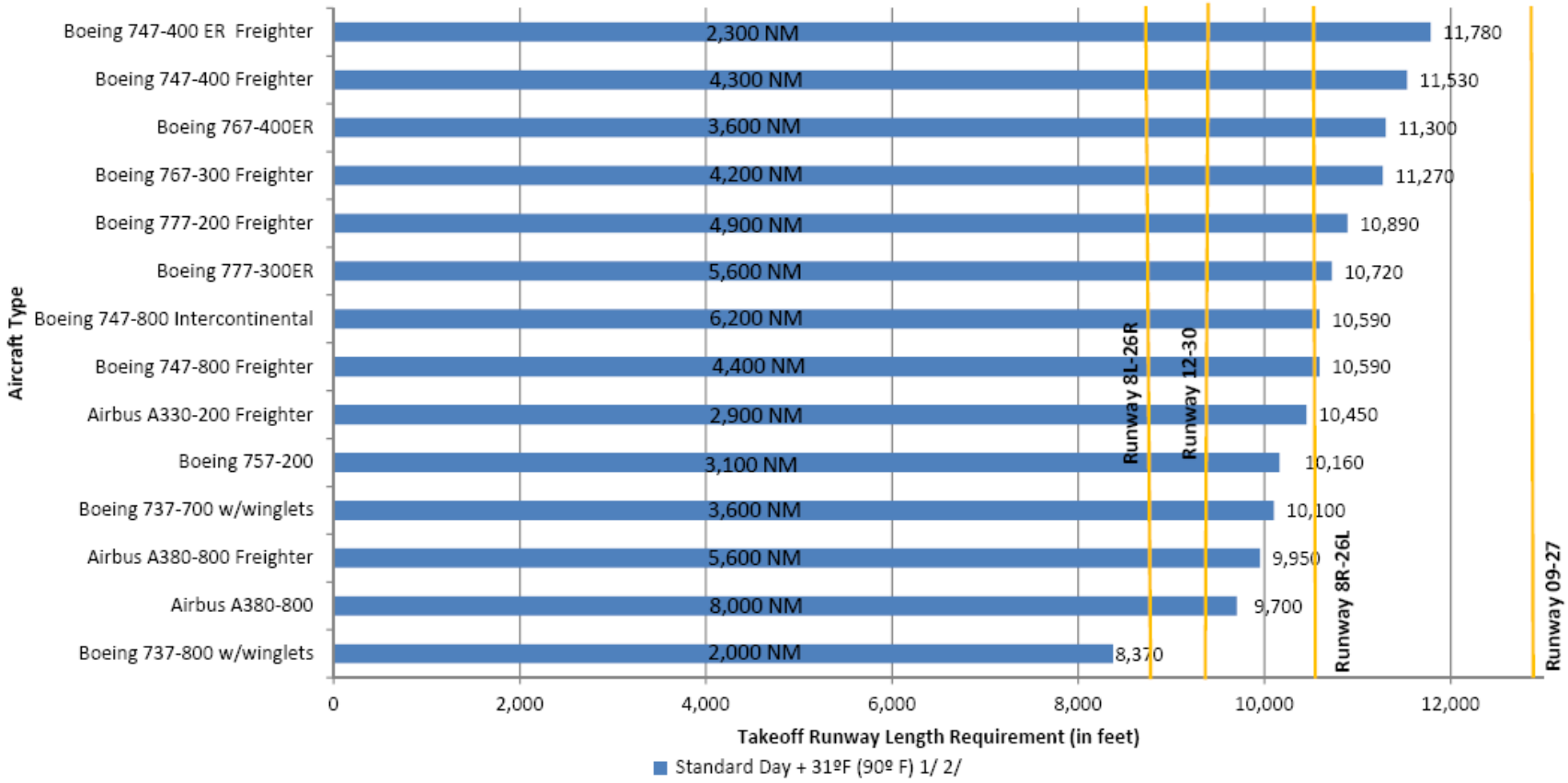
(weighted for the annualized average) or 668,000 annual operations given the projected FY 2050 aircraft fleet mix. Therefore, no additional runway capacity would be warranted within the 20-year planning horizon (through PAL 2).

Runway length at MIA was also analyzed. A representative sample of the 14 most prevalent and demanding aircraft types projected to operate at MIA during the 20-year planning horizon was evaluated. As shown on **Exhibit C-1**, the aircraft with the most demanding takeoff runway length requirements at maximum takeoff weight would require a runway length of 11,780 feet. With an overall length of 13,016 feet, Runway 9-27 has adequate length to accommodate the projected aircraft fleet mix at MIA. Some aircraft types, however, could have payload/range limitations when departing from the other three runways at MIA. In accordance with the runway exit cumulative utilization rates contained in AC 150/5300-13A, it was also determined that all four runways have adequate landing lengths to accommodate the overall aircraft fleet projected for MIA. Therefore there are no runway extensions recommendations included in the SMP.

Although the development of new runways or modification of the existing runways at MIA is not warranted during the 20-year planning horizon, the Future ALP for MIA provides consideration for the following airfield enhancements:

- **Realignment of Taxiway P** – As a result of existing constraints beyond the end of Concourses F and G, the lateral separation between Taxiways P and Taxiway Q does not meet ADG V standards. This deficiency required a Modification to Standards to be issued. However, after future modifications are completed to the Central Terminal at MIA (described below in Section C.1.2), Taxiway P will be realigned to ensure full compliance with ADG V standards. The proposed realignment of Taxiways P is illustrated on **Exhibit C-2**.
- **Realignment and extension of Taxiway R** – The current lateral separation between Runway 12-30 and parallel Taxiway R to the west is 553 feet, which exceeds the minimum separation prescribed for taxiways in Taxiway Design Group (TDG) 5. As shown on **Exhibit C-3**, the Future ALP includes consideration for reducing the separation between Runway 12-30 and Taxiway R to 450 feet, which is the recommended separation for TDG 5. The extension of Taxiway R to provide access to future cargo facility development is also proposed.
- **Reconfiguration of exit Taxiway T5** – Taxiway T5 currently serves as an acute-angled taxiway exit for aircraft landing on Runway 9. It is the last runway exit prior to the intersection of Runways 9-27 and 12-30. Because of this taxiway's close proximity to the runway intersection and its current alignment with the perpendicular crossing of Runway 12-30, the FAA has designated this area as a hot spot. During the recent rehabilitation of Runway 12-30, runway status lights were installed and no incursions have occurred since the lights became operational. As a contingency, the Future ALP provides consideration for the potential conversion of Taxiway T5 to a perpendicular runway exit, which would force pilots to access Taxiway T prior to entering crossing Runway 12-30. The proposed reconfiguration of Taxiway T5 is illustrated on **Exhibit C-4.** This improvement would likely be implemented when Runway 9-27 undergoes rehabilitation or reconstruction, assuming it is not determined that Taxiway T5 reconfiguration needs to be accelerated and completed as its own stand-alone project.

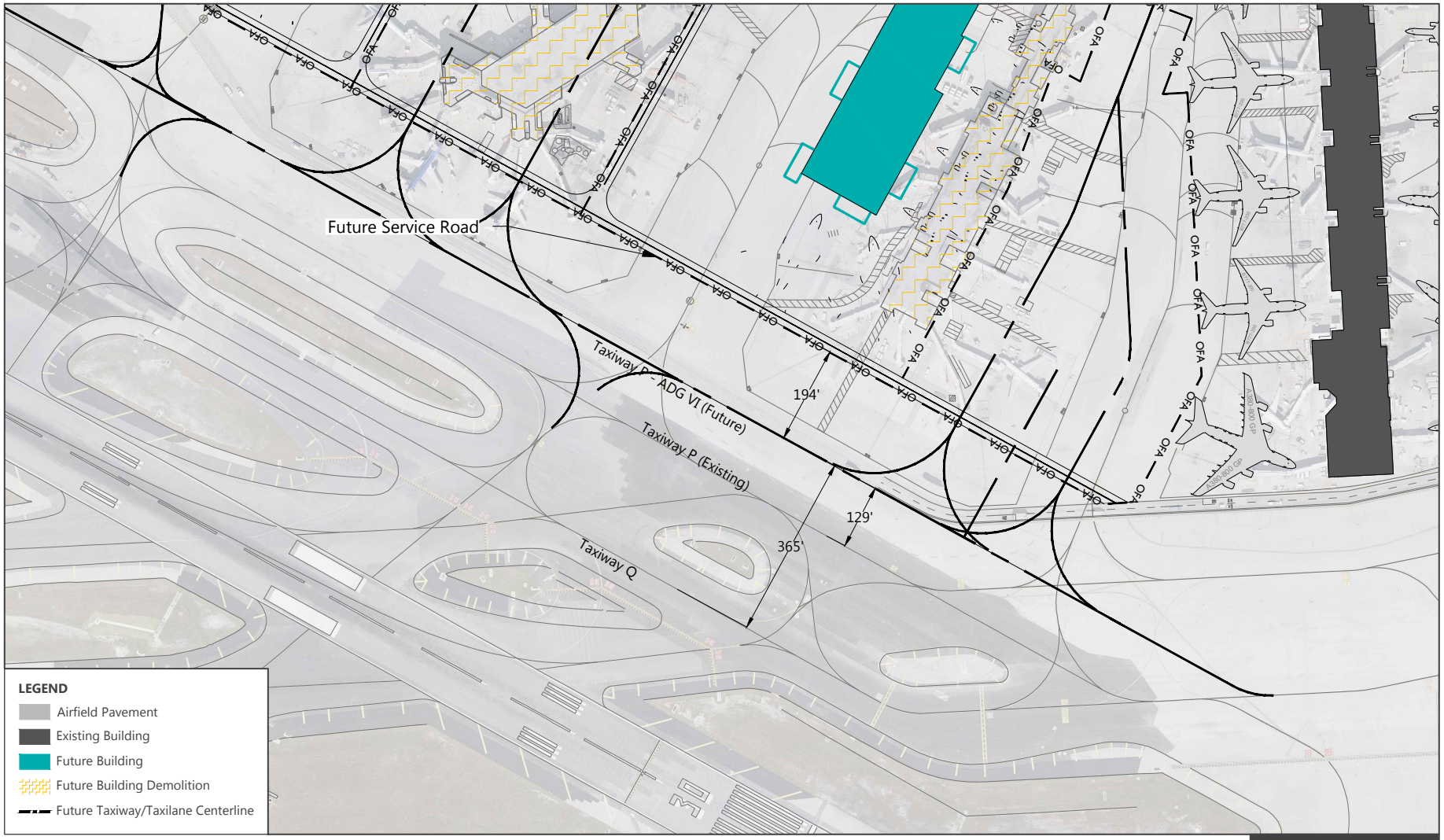
Exhibit C-1: Runway Length Requirements – Maximum Takeoff Weight



NOTES:

NM = Nautical Miles

SOURCES: The Boeing Co. and Airbus Industries, Aircraft Characteristics for Airport Planning Manuals; Ricondo & Associates, Inc., June 2012.
PREPARED BY: Ricondo & Associates, Inc., July 2011.



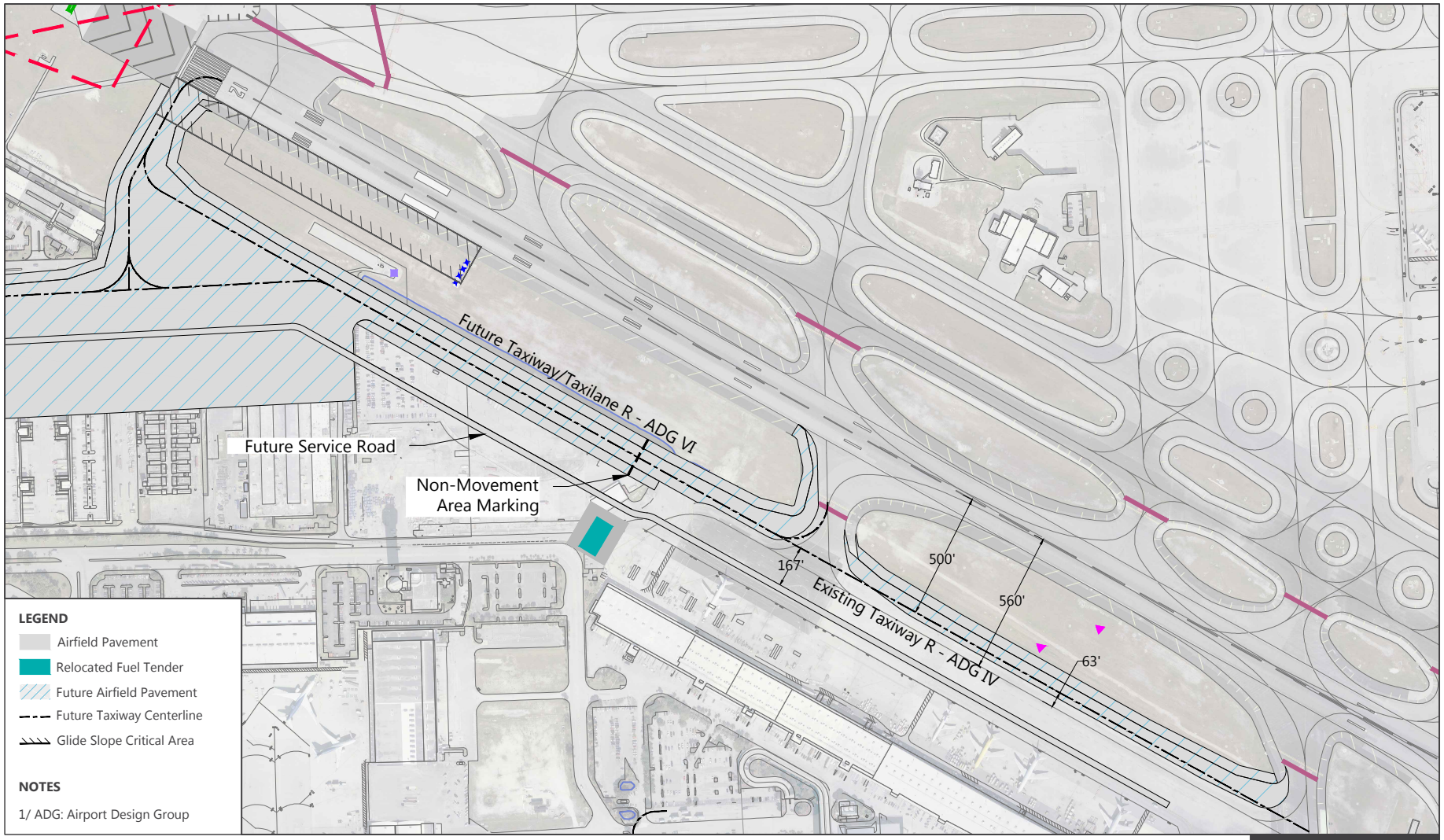
SOURCES: Aerial Cartographics of America, Inc., *MIA 2015 Planimetrics*, July 2015; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan*, September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT C-2

NORTH 0 300 ft.

Proposed Taxiway P Realignment

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Exhibits C-2 and C-[illegible].dwgLayout: C-2 Taxiway P and [illegible] Plotted: Mar 20, 2018, 03:5[illegible] PM



SOURCE: *Aerial Cartographics of America, Inc.*, MIA 2015 Planimetrics, July 2015; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan*, September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT C-3

NORTH 0 600 ft.

Proposed Taxiway R Realignment

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Exhibits C-2 and C-i .dwgLayout: C-3 Taxiway R Realign ent Plotted: Mar 20, 2018, 03:58PM

SOURCES: Aerial Cartographics of America, Inc., *MIA 2015 Planimetrics*, July 2015; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan*, September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT C-4

NORTH 0 300 ft.

Potential Exit Taxiway T5 Reconfiguration

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Exhibits C-2 and C-□.dwgLayout: C-4 T-5 Realign□ ent Plotted: Mar 20, 2018, 03:5□ PM

C.1.2 TERMINAL

The demand-capacity assessment for the terminal facility at MIA was conducted to evaluate airline aircraft parking, including contact gates and remote hardstands, as well as the passenger processing functions within the terminal building. In evaluating airline aircraft parking, peak hour parking demand established through the development of design day flight schedules that represent the typical demand characteristics associated with the peak month average day was reviewed. Passenger processing functions were assessed using a terminal simulation model.

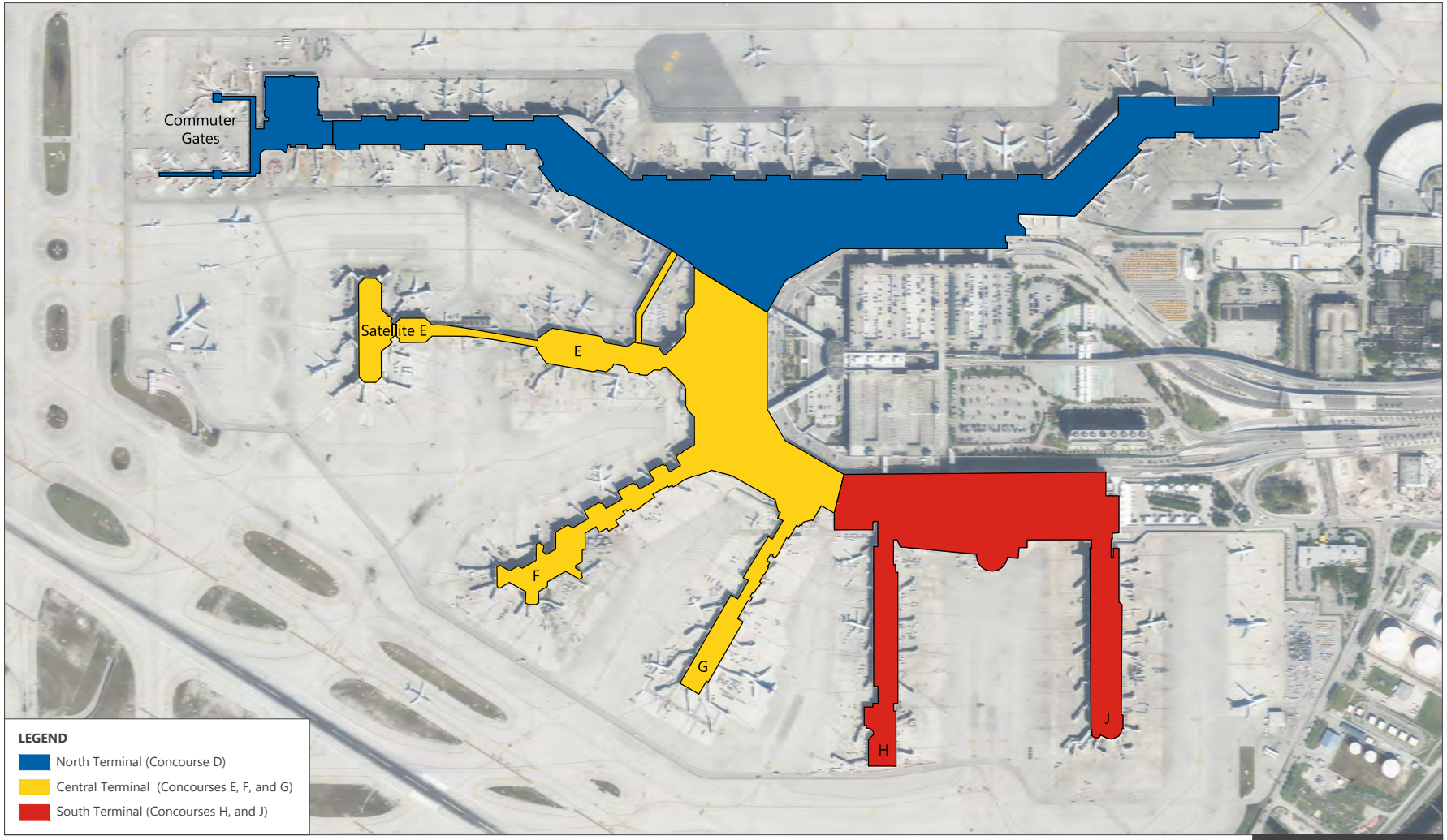
As shown on **Exhibit C-5**, the current terminal building at MIA is separated into three distinct areas, the North, Central, and South Terminals. The North Terminal consists of Concourse D, which generally serves American Airlines, the predominant hubbing airline at MIA, and its code-share partners. Concourse D also provides dedicated, ground-loaded commuter gates that serve American Eagle operations. The Central Terminal consists of Concourses E, F, G, and Satellite E. The South Terminal consists of Concourses H and J and was refurbished and expanded in 2006.

MIA's terminal complex is served by two Federal Inspection Services (FIS)/U.S. Customs facilities located in the North and South Terminals. The North Terminal FIS facility serves gates on Concourses D, E, Satellite E, and a portion of Concourse F. The South Terminal FIS facility serves gates on Concourse J and a portion of Concourse H.

The airside ramp abuts the terminal building and provides an area for air carrier aircraft to access and exit the taxiways. The ramp encompasses a total area of approximately 560,000 square yards, and a series of taxilanes allow for the safe maneuvering of air carrier aircraft to and around the concourse gates. Currently, multiple parking configurations can be accommodated at MIA by taking advantage of flexibilities at some gates that allow for the parking of one jumbo aircraft or multiple narrowbody aircraft. Rather than presenting all possible configurations, **Tables C-1** and **C-2** summarize the narrowbody aircraft configuration (highest number of gates) and the widebody aircraft configuration (largest aircraft at the gate), respectively.

Future gate requirements for MIA were derived for the peak month average day based on the SMP's Baseline Aeronautical Forecasts. Design Day Flight Schedules were developed in close coordination with the airlines serving MIA and translated into a ramp chart to derive the gate requirements for the 10-year horizon (2025) and the 20-year horizon (2035). The resulting gate requirements are summarized by airline groupings in **Tables C-3** and **C-4,** respectively. These groupings include:

- **American Airlines/oneworld Partners** – As the predominant hubbing airline at MIA, American Airlines and its code-share partners (**one**world alliance) operate predominantly out of the North Terminal and portions of Concourse E.
- **American Eagle** – Also located in the North Terminal, American Eagle serves as the regional carrier for American Airlines.
- **Other Airlines** – These airlines, outside of the **one**world alliance, are served at MDAD-operated gates.



SOURCES: Miami-Dade Aviation Department, *MIA 2014 Aerial*, December 2014; Ricondo & Associates, Inc., *Central Terminal Program Definition Document*, April 2013.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT C-5

NORTH 0 700 ft.

Existing Passenger Terminal

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\C-5 Terminal Area Map.dwg Layout: View 1-500 Plotted: Nov 18, 2015, 12:03PM

Table C-1: Gate Inventory Based on Narrowbody Aircraft Parking Plan

	AIRCRAFT GATE TYPE							
TERMINAL	**COMMUTER**	**SMALL NARROWBODY**	**LARGE NARROWBODY**	**WIDEBODY**	**JUMBO JET**	**NEW LARGE AIRCRAFT**	**COMMUTER GATES – GROUND LOADED**	**TOTAL**
North	2	10	17	18	3	-	12	**62**
Central	2	16	11	13	9	-	-	**51**
South	-	7	15	3	2	1	-	**28**
TOTAL	**4**	**33**	**43**	**34**	**14**	**1**	**12**	**141**

SOURCE: Miami-Dade Aviation Department, June 2013.
PREPARED BY: Ricondo & Associates, Inc., June 2013.

Table C-2: Gate Inventory Based on Widebody Aircraft Parking Plan

	AIRCRAFT TYPE							
TERMINAL	**COMMUTER**	**SMALL NARROWBODY**	**LARGE NARROWBODY**	**WIDEBODY**	**JUMBO JET**	**NEW LARGE AIRCRAFT**	**COMMUTER GATES – GROUND LOADED**	**TOTAL**
North	2	7	12	14	10	-	12	**57**
Central	2	9	7	16	13	-	-	**47**
South	-	4	12	4	5	1	-	**26**
TOTAL	**4**	**20**	**31**	**34**	**28**	**1**	**12**	**130**

SOURCE: Miami-Dade Aviation Department, June 2013.
PREPARED BY: Ricondo & Associates, Inc., June 2013.

Table C-3: 10-Year Horizon Gate Requirements by Airline Groups

GATE GAUGE	RJ-S	RJ-L	NB	WB	JB	NLA	TOTAL
American Airlines (AA) and **One**world alliance partners (OW)	0	0	41	2	13	1	**57**
AA + OW Spare Gates	0	0	4	0	3	0	**7**
Total Contact Gate Requirements AA + OW + Spares	**0**	**0**	**45**	**2**	**16**	**1**	**64**
American Eagle E175 Contact Gate Requirements	0	11	0	0	0	0	**11**
American Eagle E145 Ground Loaded Gate Requirements	5	0	0	0	0	0	**5**
Total Gate Requirements American Eagle	5	11	0	0	0	0	**16**
Other Airlines (OAL)	0	0	26	0	13	2	**41**
MDAD Controlled Gates/Spares	0	0	1	0	2	0	**3**
Total Contact Gate Requirements OAL + MDAD-Controlled Gates	**0**	**0**	**27**	**0**	**15**	**2**	**44**
Grand Total	**5**	**11**	**72**	**2**	**31**	**3**	**124**

NOTES:

JB = Jumbo Jet NB = Narrowbody Jet NLA = New Large Aircraft

RJ-S = Small Regional Jet RJ-L = Large Regional Jet WB = Widebody Jet

SOURCE: Ricondo & Associates, Inc., November 2013.
PREPARED BY: Ricondo & Associates, Inc., November 2013.

Table C-4: 20-Year Horizon Gate Requirements by Airline Groups

GATE GAUGE	RJ-S	RJ-L	NB	WB	JB	NLA	TOTAL
American Airlines (AA) and oneworld alliance partners (OW)	0	0	44	1	23	1	**69**
AA + OW Spare Gates	0	0	4	0	3	0	**7**
Total Contact Gate Requirements AA + OW + Spares	**0**	**0**	**48**	**1**	**26**	**1**	**76**
American Eagle E175 Contact Gate Requirements	0	17	0	0	0	0	**17**
American Eagle E145 Ground Loaded Gate Requirements	2	0	0	0	0	0	**2**
Total Gate Requirements American Eagle	**2**	**17**	**0**	**0**	**0**	**0**	**19**
Other Airlines (OAL)	0	0	29	0	15	2	**46**
MDAD Controlled Gates/Spares	0	0	1	0	2	0	**3**
Total Contact Gate Requirements OAL + MDAD-Controlled Gates	**0**	**0**	**30**	**0**	**17**	**2**	**49**
Grand Total	**2**	**17**	**78**	**1**	**43**	**3**	**144**

NOTES:

JB = Jumbo Jet NB = Narrowbody Jet NLA = New Large Aircraft

RJ-S = Small Regional Jet RJ-L = Large Regional Jet WB = Widebody Jet

SOURCE: Ricondo & Associates, Inc., November 2013.
PREPARED BY: Ricondo & Associates, Inc., November 2013.

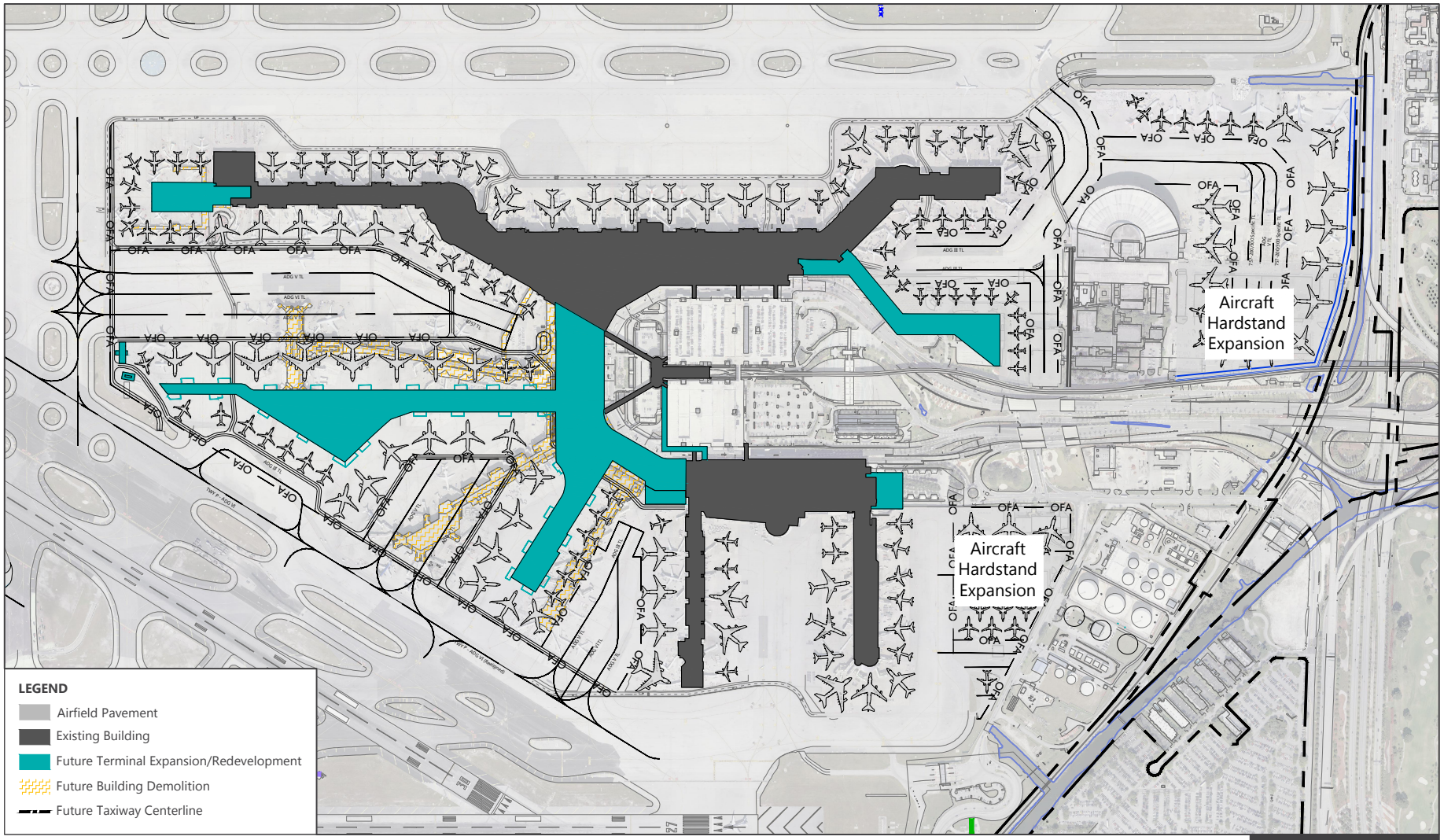
To address the terminal deficiencies anticipated prior to PAL 2, the ALP provides consideration for the future expansion of Concourse D in the North Terminal and redevelopment of the entire Central Terminal complex. Given that most of the Central Terminal was initially developed more than 50 years ago, its configuration of radial concourse piers does not provide adequate apron depth on many gates to accommodate new generation aircraft, such as the B737-700/800/900, B747-800, B787, A380, and A350. The single taxilane configuration between the piers restricts gate access and constrains aircraft circulation. The configuration of Concourses F and G results in non-standard separations between Runway 12-30 and parallel Taxiways P and Q, thereby requiring a modification to Federal Aviation Administration (FAA) design standards.

Due to the age and inefficiencies of the Central Terminal facilities at MIA, its redevelopment is necessary to support passenger demand and the growth and diversification of airlines serving the Airport today and in the future. Conceptual planning studies undertaken by MDAD for the redevelopment of the Central Terminal area have focused on modernizing the aviation facilities by replacing the existing facilities with new ones that have greater capacity, more flexibility, and improved operating efficiencies. As part of the redevelopment of the Central Terminal, MDAD also wishes to consider introducing significant opportunities for post-security, non-aeronautical revenues by maximizing the volume of space for the vertical development of retail, commercial, and other revenue-generating facilities.

Collectively, the redevelopment of the Central Terminal area is driven by each of these equally important goals:

- Improve airside aircraft circulation conditions, including dual taxilane systems and Aircraft Design Group (ADG) VI (e.g., A380-800 and B747-8) taxiing capability
- Increase aircraft gate capabilities for accommodating a growing jumbo fleet (e.g., more large aircraft such as B787-8 and -9, A350-900 and -1000, and A380-800) and meet the 2035 gate requirements
- Offer terminal-wide (domestic/international) swing gate capability
- Provide unsecure, secure (post-security checkpoints) and sterile (international arrivals) connectivity between the North, Central and South Terminals
- Improve ADG VI taxiway compatibility of Taxiway P; Taxiway P currently jogs closer to Taxiway Q around the end of Concourse F and is closed east of Taxiway U when an ADV VI aircraft taxis on Taxiway Q.
- Create a multi-phase terminal concept that includes various possible stopping points during its construction

As shown on **Exhibit C-6**, redevelopment of the Central Terminal complex would include the construction of two linear concourse piers as replacements for Concourse E, Satellite E, and Concourses F and G, as well as the central portion of the main terminal building. The Central Terminal would have a dedicated FIS facility and all gates on the two new concourses would have international arrivals capability. Concourse D would also be expanded to the east and west and all additional gates would have international arrivals capability as well. The proposed terminal improvements would provide adequate capacity to serve the PAL 2 (2035) passenger demand.



SOURCE: Aerial Cartographics of America, Inc., *MIA 2015 Planimetrics*, July 2015; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan*, September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT C-6

Future Terminal Expansion/Redevelopment

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Exhibits C-2 and C-[illegible].dwgLayout: C-[illegible] Ter[illegible] inal Redevelop[illegible] ent Plotted: Mar 20, 2018, 04:00PM

Future remote aircraft parking (hardstands) requirements for MIA were also derived for the peak month average day demand based on the Design Day Flight Schedule utilized to establish the 10-Year and 20-Year gate requirements. The resulting remote aircraft parking (hardstand) are summarized by airline groupings in **Table C-5**.

Table C-5: 20-Year Remote Aircraft Parking (Hardstand) Requirements by Airline Groups

GATE GAUGE	RJ-S	RJ-L	NB	WB	JB	NLA	TOTAL
American Airlines (AA) and oneworld alliance partners (OW)	0	0	8	0	10	0	**18**
American Eagle	3	6	0	0	0	0	**9**
Other Airlines	0	0	8	0	5	0	**13**
Total Gate Requirements American Eagle	**3**	**6**	**16**	**0**	**15**	**0**	**40**
Other Airlines (OAL)	0	0	26	0	13	2	**41**
MDAD Controlled Gates/Spares	0	0	1	0	2	0	**3**
Total Contact Gate Requirements OAL + MDAD-Controlled Gates	**0**	**0**	**27**	**0**	**15**	**2**	**44**
Grand Total	**5**	**11**	**72**	**2**	**31**	**3**	**124**

NOTES:

JB = Jumbo Jet NB = Narrowbody Jet NLA = New Large Aircraft

RJ-S = Small Regional Jet RJ-L = Large Regional Jet WB = Widebody Jet

SOURCE: Ricondo & Associates, Inc., November 2013.
PREPARED BY: Ricondo & Associates, Inc., November 2013.

C.1.3 CARGO WAREHOUSE FACILITIES

As the fourth busiest cargo airport in the United States (as of 2014), MIA's cargo facilities serve the needs of belly cargo carriers, freighters, and cargo integrators (FedEx, UPS, etc.). Analyses of the demand and capacity relationships for on-ramp (freighter/integrator) and non-ramp (belly cargo) warehouse facilities at MIA were conducted. By comparing the projected warehouse requirements with the capacity of existing facilities, future deficiencies were identified. **Table C-6** summarizes the findings of this demand-capacity analysis of cargo warehouse facilities at MIA. This analysis included consideration of the new cargo warehouse facilities constructed by Centurion Air Cargo that became operational in 2013.

As shown, MIA would have cargo warehouse deficiencies of 511,000 square feet at PAL 1 (representing 2025 and assumed to be associated with 3.0 million annual tons of cargo) and 1,625,000 square feet at PAL 2 (representing 2035 and assumed to be associated with 4.3 million annual tons of cargo). As illustrated on **Exhibit C-7**, the Future ALP for MIA depicts future cargo facility expansion that would satisfy the additional freighter warehouse requirements associated with PAL 2. However, the acquisition of approximately 230 acres of property would be required. For planning purposes, the acquisition of property west of MIA to NW 72nd Avenue (Milam Dairy Road) is being considered. Relocation of the Florida East Coast Railroad to the eastern edge of NW 72nd Avenue would also be required. An alternative to expanding the airport limits to the west for accommodating cargo facility requirements projected at PAL 2, MDAD is also exploring opportunities to construct a multilevel cargo warehouse, similar to such facilities constructed outside of the United States.

Table C-6: Projected Cargo Warehouse Facility Requirements and Deficiencies

FACILITY TYPE	2009 (ACTUAL)	PAL 1 (2025)	PAL 2 (2035)
Annual Cargo Tonnage			
Freight/Integrator (On-ramp)	1,444,336	2,596,065	3,672,631
Belly Cargo (Non-ramp)	254,883	458,129	648,111
Total	**1,699,219**	**3,054,194**	**4,320,742**
Warehouse Requirements (sq. ft.)			
Freighter/Integrator (On ramp)	1,605,000	2,586,000	3,447,000
Belly Cargo (Non-ramp)	340,000	611,000	864,000
Total	**1,945,000**	**3,197,000**	**4,311,000**
Existing Warehouse Facilities (sq. ft.)			
Freighter/Integrator (On ramp)	1,710,000	2,110,000 1/	2,110,000 1/
Belly Cargo (Non-ramp)	576,,000	576,000	576,000
Total	**2,286,000**	**2,686,000**	**2,686,000**
Surplus/(Deficiency) (sq. ft.)			
Freighter/Integrator (On ramp)	105,000	(476,000)	(1,337,000)
Belly Cargo (Non-ramp)	236,000	(35,000)	(288,000)
Total	**341,000**	**(511,000)**	**(1,625,000)**

NOTES:

1/ In 2013, Centurion Air Cargo opened a new cargo facility with a gross warehouse area of 400,000 square feet.

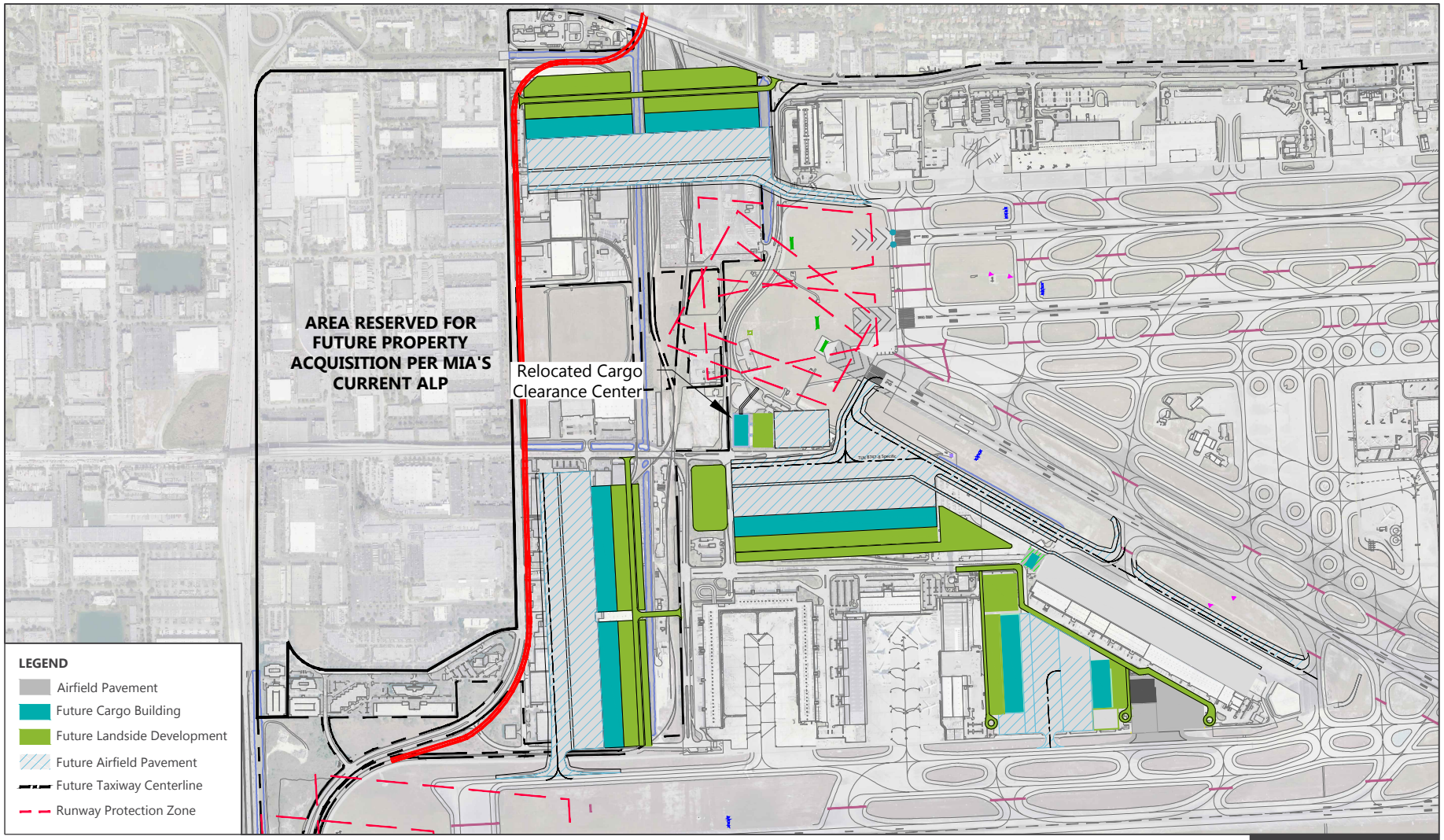
SOURCES: Webber Air Cargo, March 2009; Ricondo & Associates, Inc., May 2009.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

C.1.4 AIRCRAFT MAINTENANCE, REPAIR, AND OVERHAUL FACILITIES

MDAD leases a variety of facilities to various tenants that serve MRO operations. Two of these facilities are operated by American Airlines and LAN, the latter of which is expected to be operational by 2016. The other independent MRO facilities at MIA include aircraft maintenance hangars, shops, parts storage, and engine test cells. Interviews with these other MRO service providers indicated that they serve aircraft operators that do not operate at MIA on a regular basis.

While the need for MRO facilities operated by American Airlines and LAN can be attributed to demand associated with those airlines, other projected MRO facility needs cannot be correlated to aircraft activity operating routinely to/from MIA. To account for a diverse range of MRO facility needs, three growth scenarios were established. In each scenario, the facility requirements for airline-affiliated MROs correspond with the growth in airline operational demand and aircraft fleet mix projections. For the independent MROs, the three MRO growth scenarios are as follows:

- **Scenario 1 - Zero Investment Forecast -** In this scenario, it was assumed that the independent MRO providers will elect to invest in growth at other airports and not at MIA. Existing facilities would operate at capacity, with no growth in the number of aircraft serviced.
- **Scenario 2 - Baseline MRO Forecast -** In accordance with the North American MRO Growth Forecast contained in the Global MRO Forecast 2010-2020 that was published by Team SAI, Inc., an annual growth rate of 1.6 percent for MRO facilities was considered.



SOURCES: Aerial Cartographics of America, Inc., *MIA 2015 Planimetrics*, July 2015; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan*, September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT C-7

NORTH 0 1,500 ft.

Future Westside Cargo Expansion/Redevelopment

Drawing: \\ricondo.com\public\Miami\project\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Exhibits C-2 and C-6.dwgLayout: C-7 West Side Redevelopment Plotted: Apr 5, 2018, 04:30PM

- **Scenario 3 - Outsource Share Increase + MIA Operators Share Capture -** This scenario builds on the Baseline MRO forecasts, with an additional 5.0 percent annual growth for 5 years.

Table C-7 summarizes the gross facility requirements for the three MRO growth scenarios. As shown, the deficiency of MRO facilities at PAL 2 (2035) would range from 20.6 acres to 49.5 acres. Because of land constraints at MIA, the Future ALP provides for limited MRO facility redevelopment north of the airfield, along NW 36th Street. As illustrated on **Exhibit C-8,** this redevelopment area would be adequate to serve limited expansion of MRO facilities, regardless of which scenario materializes during the 20-year planning horizon. In recognition of the land constraints at MIA, MDAD is exploring opportunities to accommodate other MRO facility expansion throughout its system of general aviation airports.

Table C-7: Summary of Maintenance, Repair, and Overhaul Facility Requirements Scenarios (in Acres)

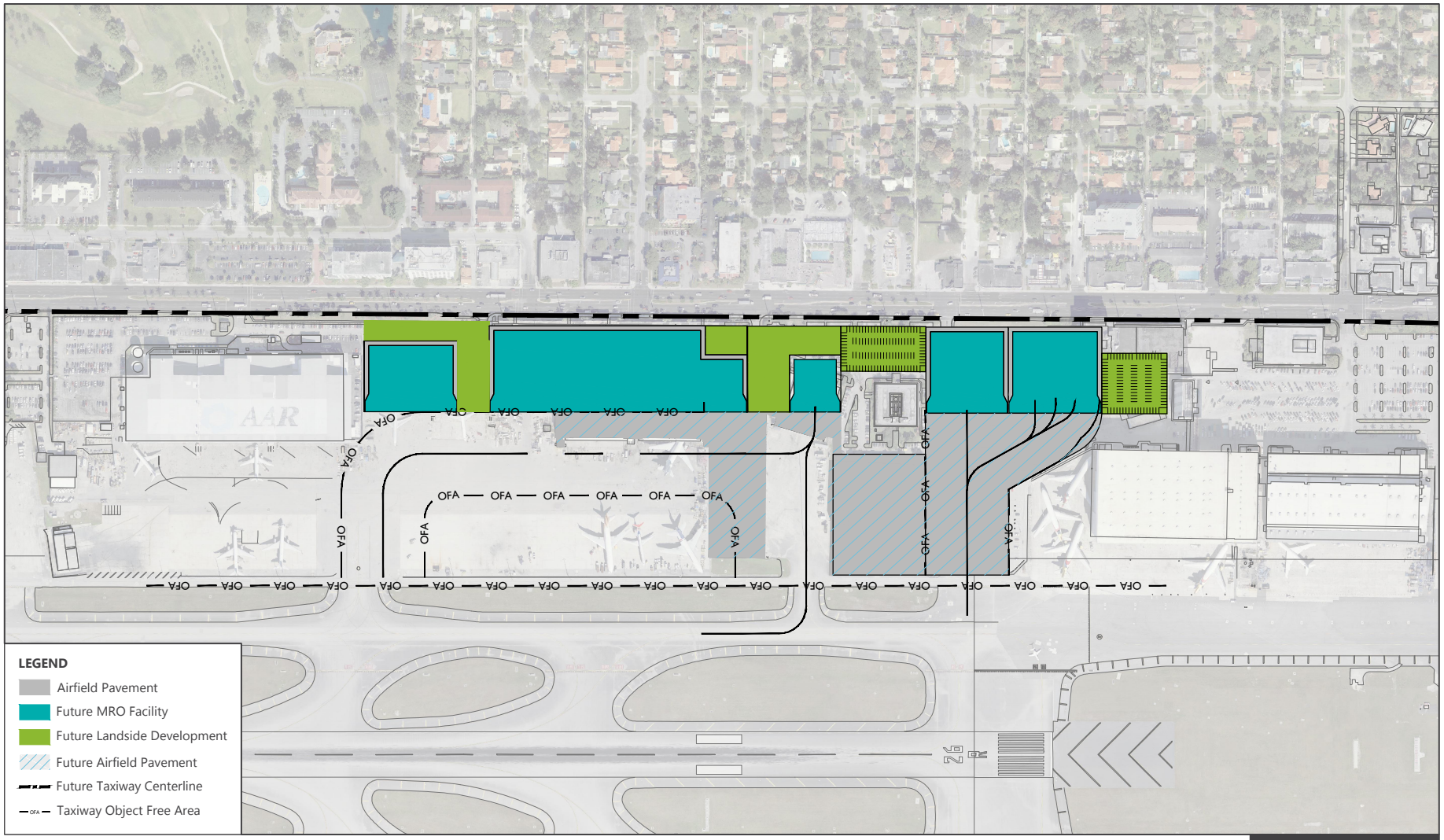
FACILITY TYPE	SCENARIO 1	SCENARIO 2	SCENARIO 3
Existing Facilities	73.2	73.2	73.2
Facility Requirements			
PAL 1 (2025)	78.9	88.6	98.2
PAL 2 (2035)	93.8	109.9	122.7
Deficiencies (Additional Facilities)			
PAL 1	(5.7)	(15.4)	(25.0)
PAL 2	(20.6)	(36.7)	(49.5)

SOURCE: Ricondo & Associates, Inc., April 2011.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

C.1.5 TERMINAL LANDSIDE FACILITIES

The Airport terminal is supported by a variety of landside facilities that will also need to be expanded during the 20-year planning horizon. These landside facilities include:

- Public parking facilities
- Employee parking facilities
- Taxicab staging areas
- Cell phone waiting lots



SOURCES: Aerial Cartographics of America, Inc., *MIA 2015 Planimetrics*, July 2015; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan*, September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT C-8

NORTH 0 500 ft.

Future Northside Maintenance, Repair, and Overhaul Redevelopment Plan

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Exhibits C-2 and C-[illegible].dwgLayout: C-8 North Side MRO Redevelop[illegible]ent Plotted: Mar 20, 2018, 04:01PM

MIA's rental car facilities are currently accommodated east of the Airport, adjacent to the Miami Intermodal Center (MIC). Expandability of the MIC for serving PAL 2 is viable given vacant space adjacent to the facility. **Table C-8** summarizes the facility requirements projected for MIA's landside facilities. To satisfy these requirements, **Exhibit C-9** illustrates the proposed expansion/relocation of the landside facilities depicted on the Future ALP. Improvements include the construction of Park 6, a multilevel public parking garage immediately east of the Flamingo Garage, and multiple garages within the confines of the Southeast Employee Parking Lot. Additional remote public and employee parking may be provided if MDAD is able to acquire a 60-acre tract of land immediately east of the Miami Intermodal Center. If this property is not acquired, an additional parking garage would be collocated with the GSE maintenance facility proposed immediately south of Building 3095, the American Airlines aircraft maintenance hangar. The taxicab staging area would be relocated to a site adjacent to NW 42nd Court, while a centralized cell phone waiting lot would be constructed along the south side of NW 21st Street, immediately east of NW 42nd Avenue (LeJeune Road).

Table C-8: Landside Facility Parking Requirements Summary

FACILITY TYPE	EXISTING CAPACITY (2009)	PAL 2 (2035) FACILITY REQUIREMENTS	PAL 2 (2035) DEFICIENCY
Public Parking Spaces			
Short-term	324	520	196
Long-term	7,338	10,300	2,962
Valet	120	180	620
Economy	542	570	28
Total Spaces (Public Parking)	**8,324**	**11,570**	**3,246**
Employee Parking Spaces	**5,911**	**10,080**	**4,169**
Taxicab Staging Area [1/]	**300**	**300-350**	**0-50**
Cell Phone Waiting Lot	**60**	**120**	**60**

NOTE:

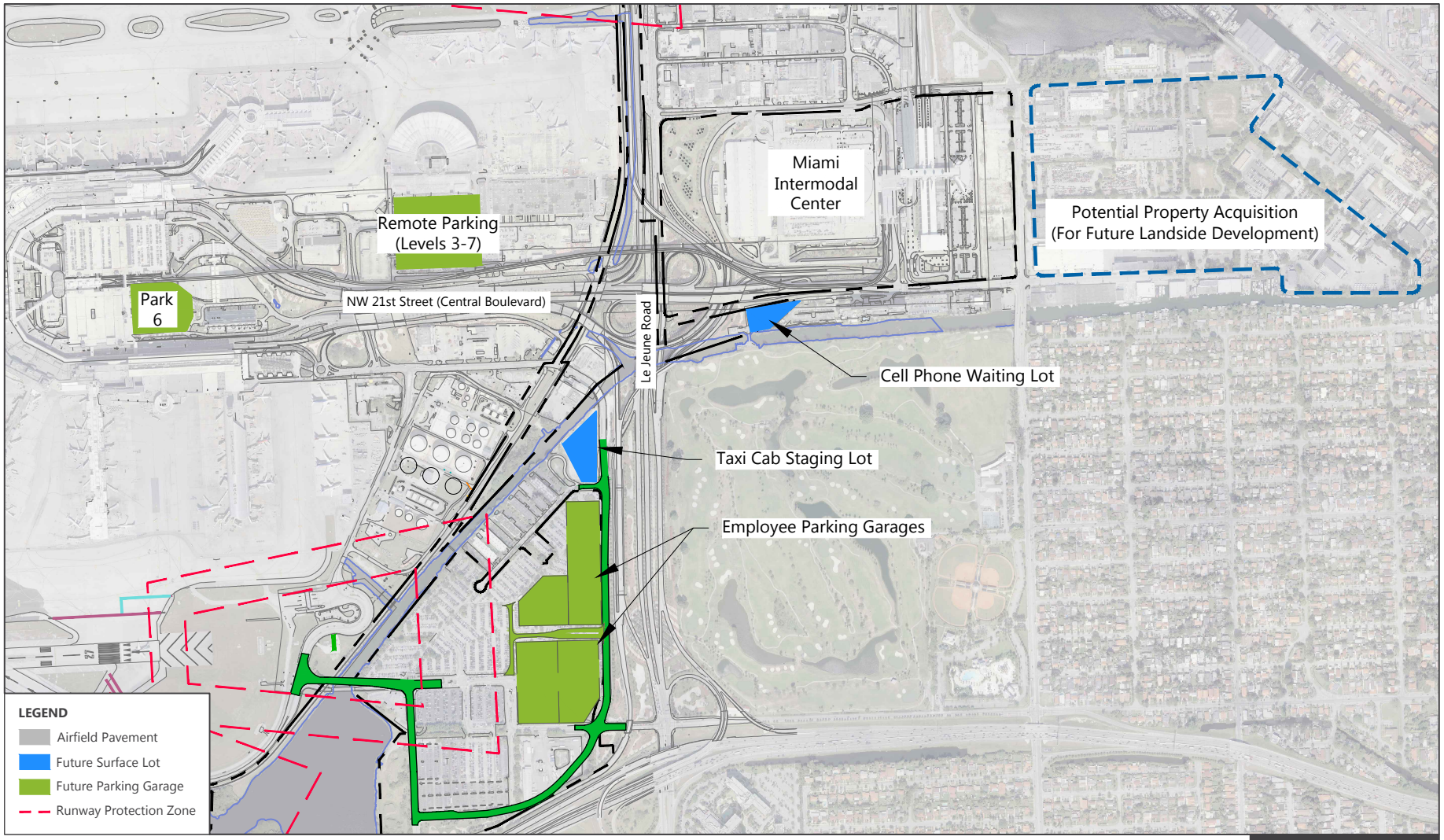
1/ The proposed expansion of Concourse D in the North Terminal will displace the current taxicab staging area and, therefore, requires relocation. MDAD recently completed a project book for the planned relocation of the taxicab staging lot, which indicates that the new taxicab staging lot will provide a capacity of 300 -350 staging positions.

SOURCES: T. Y. Lin International, *MIA Taxi Lot Relocation Project Book*, July 2015; Ricondo & Associates, Inc., May 2011.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

C.1.6 AVIATION SUPPORT FACILITIES

An evaluation of the various aviation support facilities at MIA was conducted. These support facilities include:

- Airport administration
- Ground service equipment storage and maintenance
- Fuel farm
- Aircraft rescue and fire-fighting



SOURCES: Aerial Cartographics of America, Inc., *MIA 2015 Planimetrics*, July 2015; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan*, September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT C-9

NORTH 0 1,100 ft.

Future Terminal Area Landside Improvements

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Exhibits C-2 and C-[illegible].dwgLayout: C-[illegible] Ter[illegible]inal Landside I[illegible]prove[illegible]ents Plotted: Mar 20, 2018, 04:02PM

Table C-9 summarizes the facility requirements projected for MIA's aviation support facilities. To satisfy these requirements, **Exhibit C-10** illustrates the proposed expansion/relocation of the landside facilities depicted on the Future ALP.

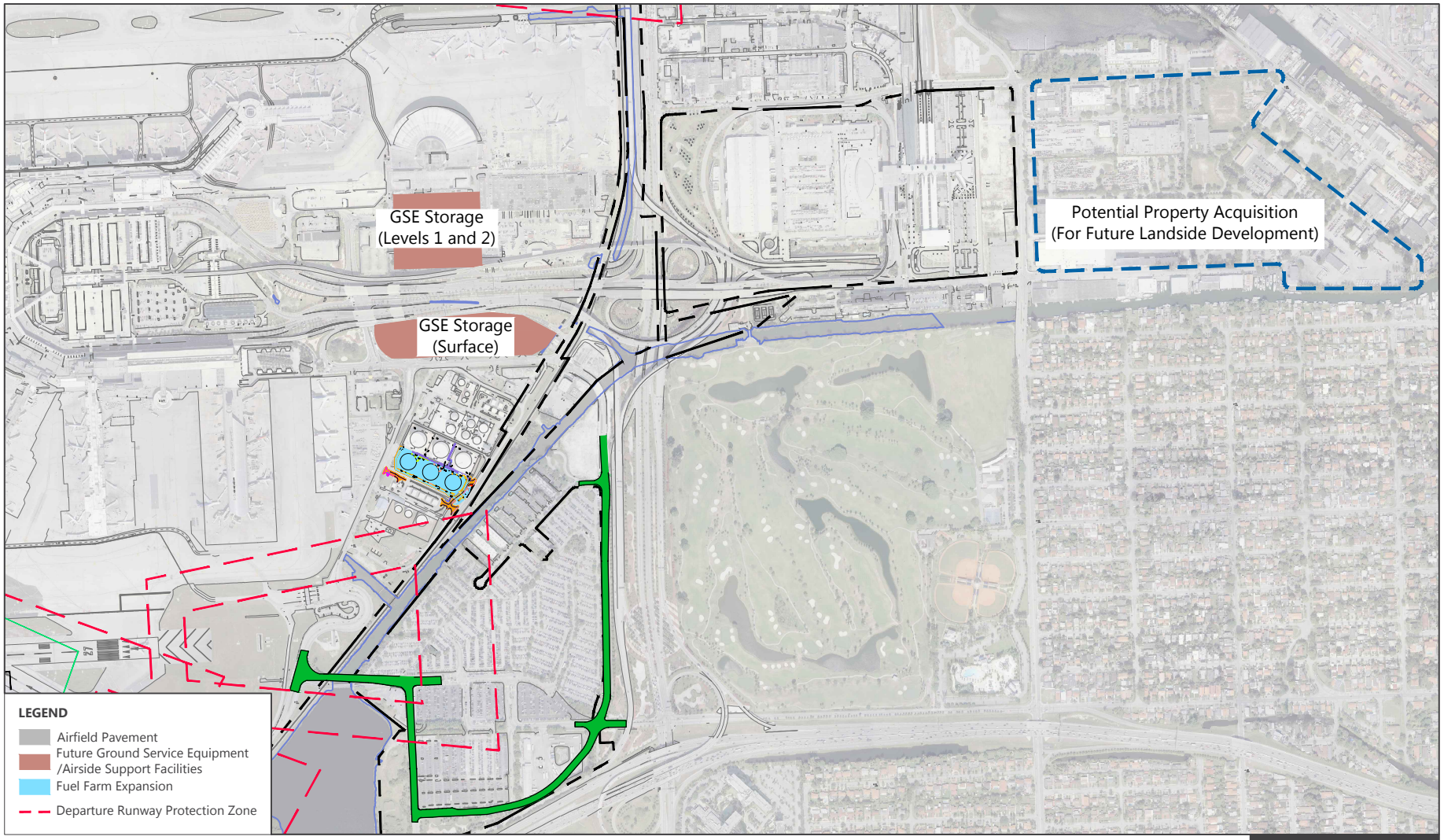
Table C-9: Aviation Support Facility Needs

FACILITY TYPE	EXISTING (2009)	PAL 2 (2035) GROSS FACILITY REQUIREMENTS	ADDITIONAL FACILITIES NEEDED TO SERVE PAL 2 (2035)
Airport Administration			
Area (square feet)	281,400	484,500	203,100
Area (acres)	6.5	11.1	4.6
Ground Service Equipment Storage and Maintenance			
Area (square feet)	420,000	702,000	282,000
Area (acres)	9.6	16.1	6.5
Aircraft Rescue & Fire-Fighting (square feet)			
Area (square feet)	51,000	51,000	0.0
Area (acres)	1.2	1.2	0.0
Subtotals:			
Area (square feet)	752,000	1,237,500	0.0
Area (acres)	17.3	28.4	11.1
Fuel Farm Storage			
U.S. Gallons	17,715,600	25,901,000	8,184,400

SOURCES: Ricondo & Associates, Inc., *SMP Technical Analyses*, March 2012.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

C.2 Near-Term and Future Approach Procedure Requirements

Approach procedures at MIA are anticipated to remain unchanged through the 20-year planning horizon.



SOURCES: Aerial Cartographics of America, Inc., *MIA 2015 Planimetrics*, Miami-Dade Aviation Department, July 2015; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan*, September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT C-10

NORTH 0 1,100 ft.

Future Aviation Support Facilities

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Exhibits C-2 and C-[illegible].dwgLayout: C-10 Aviation Support [illegible]acilities Plotted: Mar 20, 2018, 04:03PM

C.3 Navigational Aids

MIA has both visual and instrument approach aids presently, which are anticipated to remain in place, as summarized in **Table C-10**.

Table C-10: Miami International Airport Navigational Aids

	RUNWAY LIGHTS		RUNWAY MARKINGS		VISUAL APPROACH AIDS		INSTRUMENT APPROACH AIDS	
RUNWAYS	**EXISTING**	**FUTURE**	**EXISTING**	**FUTURE**	**EXISTING**	**FUTURE**	**EXISTING**	**FUTURE**
Runway 8L	HIRL	Same	Non-Precision	Same	PAPI-4, REIL	Same	LOC, DME GPS	Same
Runway 26R	HIRL	Same	Non-Precision	Same	PAPI-4, REIL	Same	LOC, DME GPS	Same
Runway 8R	HIRL	Same	Precision	Same	ILS, DME, LOC, GPS	Same	MALSR, PAPI-4	Same
Runway 26L	HIRL	Same	Precision	Same	ILS, DME, LOC, GPS	Same	MALSR, PAPI-4	Same
Runway 9	HIRL	Same	Precision	Same	ILS, LOC, GPS	Same	MALSR, PAPI-4	Same
Runway 27	HIRL	Same	Precision	Same	ILS, LOC, GPS	Same	MALSR, PAPI-4	Same
Runway 12 (13)	HIRL	Same	Precision	Same	ILS, DME, GPS	Same	MALSR, PAPI-4	Same
Runway 30 (31)	HIRL	Same	Precision	Same	ILS, DME, GPS	Same	MALSR, PAPI-4	Same

NOTES:

DME = Distance Measuring Equipment

GPS = Global Positioning System

HIRL = High Intensity Runway Lights

ILS = Instrument Landing System

LOC = Localizer

MALSR = Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights

PAPI-4 = Precision Approach Path Indicator (4 box unit)

REIL = Runway End Indicator Lights

SOURCE: Ricondo & Associates, Inc., September 2015.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

C.4 Wind Coverage

Table C-11 summarizes the wind coverage's associated with each runway at MIA. As shown, all four runways provide a combined all weather wind coverage of 99.99 percent coverage. Since the wind coverage associated with the existing runway configuration at MIA exceeds 95 percent, no additional runways are required to provide adequate wind coverage.

Table C-11: Runway Wind Coverage's

RUNWAY	RUNWAY DESIGN CODE	MAXIMUM CROSSWIND COMPONENT	ALL WEATHER WIND COVERAGE
8L-26R	D-V	20 knots	99.98%
8R-26L	D-VI	20 knots	99.98%
9-27	D-VI	20 knots	99.98%
12-30	D-V	20 knots	99.98%
		Combined	**99.99%**

SOURCE: National Climatic Data Center, US Department of Commerce; Asheville, North Carolina, January 2005 through December 2014.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

D. Modifications to Standards

There are currently 44 Modifications to Standards (MOS) for MIA. These modifications to standards are summarized in **Table D-1** below.

Table D-1 (1 of 3): Miami International Airport – Modifications to Standards

MOS ID	DESCRIPTION	STATUS	FAA APPROVAL DATE	FUTURE REMEDIATION
AD-1	Exit Taxiways are based on special design Runways 8R/26L, 9/27, and 12/30.	Valid	5/6/1974	None
AD-3	Part 77 Approach Surface to Runway 27 has 8' + or - violation of clearance over Railroad.	Valid	5/6/1974	None
AD-4a	Part 77 Transitional Surface south of Runway 9/27 violated by clearance requirements over Interior Service Road, Perimeter Road, and Railroad.	Valid	5/6/1974	None
AD-5b	Reduction of clearance between taxiway and service road north of Runway 26L threshold to 115', some operational restrictions imposed.	Not Valid	8/12/1977	None
AD-6	Reduction of clearance requirement by runway 9/27 extension south transitional surface over Interior Service Road.	Valid	12/12/1979	None
AD-7	Approach and transitional surfaces to Runway 9 penetrated by clearance requirements over Railroad.	Valid	12/12/1979	None
AD-8	Transitional surface along south side of Runway 9/27 extension penetrated by Railroad clearance requirements.	Valid	12/12/1979	None
AD-9	Buildings 900' west of Runway 9 end, penetrates south-side transitional surface by 6½'.	Not Valid	12/12/1979	None
AD-10	Clearance plane over SR826, Palmetto Expressway, penetrates approach surface for Runway 9.	Valid	12/12/1979	None
AD-11	Ten light poles in SR826, Palmetto Expressway, penetrate approach surface for Runway 9.	Valid	12/12/1979	None
AD-15	Outer terminal apron vehicular roadway on certain portions of the apron has 137' separation from the centerline of B747 taxiway.	Valid	11/21/1984	None

Table D-1 (2 of 3): Miami International Airport – Modifications to Standards

MOS ID	DESCRIPTION	STATUS	FAA APPROVAL DATE	FUTURE REMEDIATION
AD-S1	Runway to taxiway separation at 350', Runway 12/30 between concourses 'F' and 'H'. Runway in vicinity of Concourse 'H'.	Valid	7/16/1985	Partially with proposed redevelopment of Central Terminal
AD-S2	Taxiway-to-taxiway separation at 237' between Concourses 'F' and 'H' instead of 251'.	Valid	7/16/1985	Yes, with proposed redevelopment of Central Terminal
AD-S3 (a to c)	Encroachment on building restriction line of 750' by 3 buildings (190', 140', and 35').	Valid	7/16/1985	None
AD-T1 (a to c)	Penetrations of 34:1 (TERPS) at Runway 30 displaced threshold.	Valid	7/16/1985	None
AD-A1 (a to g)	Penetrations: Railroad; Perimeter Road; Interior Service Road; SR836 highway sign, light standards; and apartment building of 50:1 or 34:1 approach surface or 7:1 transition surface to end of Runway 30.	Valid	7/16/1985	None
AD-A2	Encroachment of 1000' wide primary surface of Runway 12/30 by 14' +/- by Interior Service Road.	Valid	7/16/1985	None
AD-A3 (a to d)	Penetration of 7:1 transitional surface on south side of Runway 12/30 by portions of building 2121, B747 tail, and ATC Tower.	Valid	7/16/1985	None
AD-N1	Clearance area of runway 12 Glide Slope by Building 2121, Interior Service Road, and NW 25th Street.	Valid	7/16/1985	None
AD-N2	Runway 30 MALSR penetration of light plane.	Valid	7/16/1985	None
AD-19	Automobile parking garages under Part 77 surfaces within the Runway Protection Zone (RPZ) for Runway 27.	Valid	8/20/1987	None
AD-20	Penetration by the Interior Service Road to the Glide Slope for Runway 9 under CAT II/III operations.	Not Valid	8/30/1994	None
AD-21	Aircraft on queuing taxiway within runway 27 RPZ. Imaginary surfaces for FAR 121.171 and AC150/5300-13, Appendix 2 (Minimum > 3/4 mile).	Valid	8/30/1994	None
AD-22	Reduced aircraft type specific separation between Taxiways 'M' and 'N' between, taxiways 'M13, and 'N15' to allow a B757 taxilane.	Valid	8/27/1999	None
AD-23	Use of Miami-Spiral" exit taxiway geometry for angled high-speed runway exit taxiways on Runway 8-26."	Valid	8/1/1999	None
4	ADG VI aircraft to operate on Runway 9-27 with Blast Pad 250' width.	Unconditionally Approved	2-Aug-11	Blast pad to be Widened to 280'.
5	ADG VI aircraft to operate on Runway 8R-26L with blast pad 250' width.	Unconditionally Approved	2-Aug-11	Blast pad to be Widened to 280'.

Table D-1 (3 of 3): Miami International Airport – Modifications to Standards

MOS ID	DESCRIPTION	STATUS	FAA APPROVAL DATE	FUTURE REMEDIATION
17	Runway to taxiway separation at 409', where Taxiway Q parallels Runway 9R-27L.	Conditionally Approved	2-Aug-11	None
18	Runway to taxiway separation at 400', where Taxiway T parallels Runway 9-27.	Conditionally Approved	2-Aug-11	None
19	Runway to taxiway separation at 400', where Taxiway M parallels Runway 8R-26L.	Conditionally Approved	2-Aug-11	None
20	Runway to taxiway separation at 400', here Taxiway L parallels Runway 8R-26L.	Conditionally Approved	2-Aug-11	None
21	Runway to taxiway separation at 400', where Taxiway K parallels Runway 8L-26R.	Conditionally Approved	2-Aug-11	None
22	Taxiway to taxiway separation at 237', between Taxiway U and the future threshold of Runway 27.	Conditionally Approved	2-Aug-11	None
23	Taxiway to taxiway separation at 300', between Taxiways S and T	Conditionally Approved	2-Aug-11	None
24	Taxiway to taxiway separation at 300' between Taxiway M and Taxiway T4.	Conditionally Approved	2-Aug-11	None
25	Taxiway to taxiway separation at 300', between Taxiways M and N	Conditionally Approved	2-Aug-11	None
26	Taxiway to taxilane separation at 245' between Taxiways N and Boeing 767-400 taxilane.	Conditionally Approved	2-Aug-11	None
27	Taxiway to taxiway separation at 300' between Taxiways Y and HH	Conditionally Approved	2-Aug-11	None
28	Taxiway to taxiway separation at 300' between Taxiways Y and W	Conditionally Approved	2-Aug-11	None
29	Taxiway to Taxiway Separation at 300' between Taxiway JJ and HH	Conditionally Approved	2-Aug-11	None
30	Taxiway to service road separation at 170' between Taxiway S and service road.	Conditionally Approved	2-Aug-11	None
32	Taxiway to service road separation at 160' between Taxiway S and service road.	Conditionally Approved	2-Aug-11	None
34	Operation of A380 aircraft on ADG-V Runway 9-27. Runway is 150' wide with 25' wide shoulders.	Unconditionally Approved	2-Aug-11	Runway to be widened to 280'.
35	Operation of A380 aircraft on ADG-V Runway 8R-26L. Runway is 200' wide with 35' wide shoulders	Unconditionally Approved	2-Aug-11	Runway shoulders to be widened to 40'.

SOURCES: Airport Layout Plan, Miami International Airport, June 2007; Ricondo & Associates, Inc., August 2015.
PREPARED BY: Ricondo & Associates, Inc., August 2015.

E. Obstruction Surfaces

Except for the airfield modifications described in this report, no other airfield modifications are planned at MIA. Therefore, no changes to the airspace surfaces associated with the existing airfield are anticipated.

On November 13, 2014, a comprehensive obstruction survey for MIA was performed by Aerial Cartographics of America. The obstacle data files resulting from this survey serve the basis for the obstacle analyses contained on the airspace drawing sheets. Currently, there are four obstructions to the threshold siting surface associated with Runway 8R. All of the thresholds siting surface penetrations are caused by trees and will be mitigated through trimming or removal.

In accordance with the obstruction survey, 159 obstructions to 14 CFR Part 77 surfaces have been identified for MIA. Of these 159 obstructions, two are in the approach surface, 49 are in the primary surface, 29 are in the horizontal surface, in five the conical surface and 74 are in the transitional surface. Also, 88 penetrations have been identified to the departure surfaces described in FAA Order 8260.3B (Change 26), *United States Standards for Terminal Instrument Procedures* (TERPS).

F. Runway Protection Zone

Runway protection zones (RPZs) enhance the protection of people and property on the ground. The existing RPZs for all runways at MIA except Runway 26R extend beyond the Airport boundary. The FAA released its *Interim Guidance on Land Uses within a Runway Protection Zone* in September 2012. The guidance stipulates that, while FAA AC 150/5300-13A (Change 1), *Airport Design,* notes that "it is desirable to clear all objects from the RPZ," it also acknowledges that "some uses are permitted" with conditions and other "land uses are prohibited."

No recent developments have increased the incompatible land uses within the existing RPZs, but some incompatible uses exist. Specifically, parking areas and public roadways fall within all RPZs that extend beyond the Airport boundary. No future developments are anticipated to increase incompatible land uses within the RPZs and MDAD will continue to work with FAA Airports District Office staff on those existing conditions. However, at this time, the mitigation of these incompatible land uses would have significant capital costs to MDAD and are not considered to be practical.

G. Development Summary

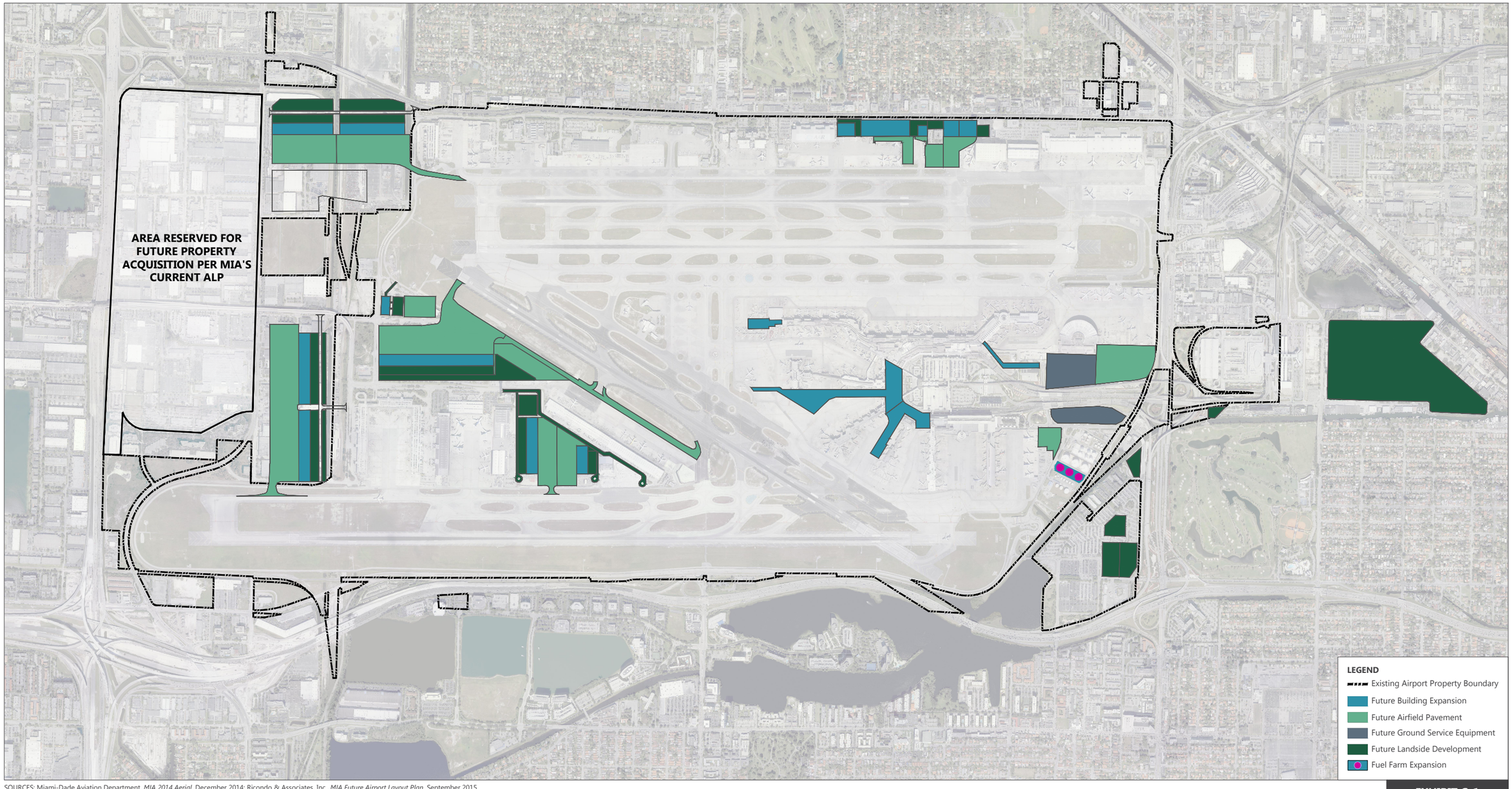
Using the gross facility requirements derived for MIA, three strategic development options were generated for the Airport. These development scenarios included:

- **Strategic Option #1** – Optimize aeronautical uses within the existing MIA property boundary. This option would not satisfy PAL 2 (2035) operational demand.
- **Strategic Option #2** – Expand the Airport property envelope through property acquisition to the west and east, but limiting the west acquisition area to NW 72nd Avenue (Milam Dairy Road). By displacing all independent MRO facilities from MIA and encouraging the use of the County's reliever airports (OPF and TMB), this option could satisfy the PAL 2 (2035) demand.
- **Strategic Option #3** – Expand the Airport property envelope through property acquisition to the west and east, but limiting the west acquisition area to State Road 826 (Palmetto Expressway) as shown on the existing ALP for MIA. This option could satisfy demand beyond PAL 2 (2035).

The Future ALP carries over the proposed land acquisition from the existing ALP drawing for MIA and incorporates consideration for implementing Strategic Option #2, which is illustrated on **Exhibit G-1**. This option provides for potential property acquisition to both the west and east, which would mitigate the current land constraints at the Airport. The western acquisition area encompasses approximately 230 acres to NW 72nd Avenue (Milam Dairy Road) and would serve future cargo facility expansion. An additional 60 acres of property may also be acquired immediately east of the Miami Intermodal Center, which could serve as an extension of the area that accommodates a variety of landside functions, including remote public and employee parking, taxicab staging, and/or a cell phone waiting lot. Although these planned acquisition areas would enable expansion of the capacity of existing facilities, the ability to serve future demand would still be constrained, inhibiting the ability of the Airport to serve some of the PAL 2 (2035) demand. Therefore, MDAD is exploring opportunities to serve this demand, particularly for general aviation and MRO operations, at the general aviation airports within the County's system of airports or through the acquisition of additional property west of NW 72nd Avenue.

G.1 Rough-Order-of-Magnitude (ROM) Cost Estimates

ROM cost estimate were prepared for Strategic Option #2. The facility requirements projected for PAL 2 (2035) formed the basis for generating the cost estimates of probable costs. These costs include construction costs and soft costs associated with design, permitting, bidding, construction, and program management. A preliminary estimate of land acquisition costs associated with the adjacent properties to be used for future expansion of cargo and landside facilities, as well as the acquisition of land with the RPZs, were also provided.



SOURCES: Miami-Dade Aviation Department, *MIA 2014 Aerial,* December 2014; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan,* September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT G-1

NORTH 0 1,700 ft.

MIA Development Plan
Strategic Option #2

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Option 2 Staging 20180320.dwgLayout: Date Plotted: Mar 20, 2018, 02:4 PM

Table G-1 summarizes the ROM costs for implementation of Strategic Option #2 through PAL 2 (2035). As shown, the total acquisition and capital improvement costs are estimated to be $4.86 billion, in 2014 dollars.

Table G-1: Rough Order-of-Magnitude Estimate of Probable Costs – Strategic Option #2

COST ITEM	ROM COSTS (2014 DOLLARS)
Property Acquisition	$566,040,000
Enabling Projects 1/	$369,094,000
Airfield Modifications 2/	$42,053,000
Terminal Expansion/Redevelopment	$2,624,407,000
Terminal Landside Improvements	$235,089,000
Cargo Facilities	$796,397,000
Aviation Support Facilities	$229,082,000
MRO Facilities 3/	$-
Total	**$4,862,162,000**

NOTES:

1/ Enabling projects are reflective of the demolition and site preparation activities associated with acquired properties.

2/ The costs associated with the Taxiway R realignment are pending the preparation of cost estimates by RIB U.S. Cost, Inc.

3/ Aircraft Maintenance, Repair and Overhaul (MRO) facilities to be funded by a third party developer.

SOURCES: URS Corporation, Construction Costs, April 2014; MIA Taxi Lot Relocation Project Book, TYLyn International, Inc., July 2015; RIB U.S. Cost, Inc., September 2015; Ricondo & Associates, Inc., SMP Technical Analyses, November 2012 through August, 2014.

PREPARED BY: Ricondo & Associates, Inc., November 2015.

G.2 Development Projects Completed Since Existing ALP

The following development projects at MIA have been completed since the existing approved ALP dated August 10, 2011:

- North Terminal airside apron improvements
- Central Boulevard widening
- Centurion Cargo Facilities
- NW 42nd Court construction
- LAN aircraft maintenance hangar construction (scheduled completion is December 2015)

G.3 Implementation Plan

For capital planning considerations, the facility and infrastructure development initiatives associated with the preferred development scenario were categorized into one of four development phases. Each phase reflects a 5-year period, as follows:

- Phase 1 (2016 - 2020)
- Phase 2 (2021 – 2025)

- Phase 3 (2026 – 2030)
- Phase 4 (2031 – 2035)

The sequencing of proposed capital investments outlined in the SMP is summarized in **Table G-2**. **Exhibits G-2** through **G-5** illustrate the sequencing of facility development in accordance with the four development phases listed above.

Table G-2 (1 of 2): Miami International Airport - Capital Investments by Phase (in 2014 Dollars)

DESCRIPTION	PHASE 1	PHASE 2	PHASE 3	PHASE 4	TOTAL
Property Acquisition					
Runway Protection Zone Mitigation	$19,080,000	$-	$13,780,000	$3,780,000	$46,640,000
Florida East Coast Railroad Relocation	$-	$105,216,000	$-	$-	$105,216,000
Cargo Development	$26,500,000	$269,116,000	$26,348,000	$-	$321,964,000
Landside Support	$-	$92,220,000	$-	$-	$92,220,000
Subtotal (Acquisition)	**$45,580,000**	**$466,552,000**	**$40,128,000**	**$13,780,000**	**$566,040,000**
Enabling Projects:					
Building and Site Demolition	$45,855,000	$76,262,000	$74,763,000	$ 24,671,000	$221,551,000
Site Preparation	$36,637,000	$42,126,000	$49,548,000	$ 19,232,000	$147,543,000
Subtotal (Enabling)	**$82,492,000**	**$118,388,000**	**$124,311,000**	**$43,903,000**	**$369,094,000**
Airfield Modifications					
Taxiway R Realignment [1/]	$36,676,633	$-	$-	$-	$36,676,633
Taxiway M5 Reconfiguration	$1,568,000	$-	$-	$-	$1,568,000
Taxiway T5 Reconfiguration	$-	$-	$-	$ 3,808,000	$3,808,000
Subtotal (Airfield)	**$38,245,000**	**$-**	**$-**	**$3,808,000**	**$42,053,000**
Terminal Improvements					
North Terminal Expansion	$206,267,000	$412,534,000	$-	$-	$618,801,000
Central Terminal	$-	$165,034,000	$825,168,000	$825,168,000	$1,815,370,000
South Terminal	$-	$130,732,000	$-	$-	$130,732,000
Aircraft Hardstands	$59,504,000	$-	$-	$-	$59,504,000
Subtotal (Terminal)	**$265,771,000**	**$708,300,000**	**$825,168,000**	**$825,168,000**	**$2,624,407,000**
Landside Improvements					
Parking Garages	$205,945,000	$-	$-	$-	$205,945,000
Surface Parking	$12,835,000	$-	$-	$-	$12,835,000
Taxicab Staging	$3,196,000	$-	$-	$-	$3,196,000
Cell Phone Waiting Lot	$205,000	$-	$-	$-	$205,000
Terminal Roadway/Curbfront	$-	$-	$12,908,000	$-	$12,908,000
Subtotal (Landside)	**$222,181,000**	**$-**	**$12,908,000**	**$-**	**$235,089,000**

Table G-2 (2 of 2): Miami International Airport - Capital Investments by Phase (in 2014 Dollars)

DESCRIPTION	PHASE 1	PHASE 2	PHASE 3	PHASE 4	TOTAL
Cargo Facilities					
Optimize Existing Facilities	$56,619,000	$76,708,000	$-	$-	$133,337,000
Warehouse Facilities	$-	$77,042,000	$247,478,000	$32,439,000	$356,959,000
Airside Access	$-	$48,387,000	$67,232,000	$20,373,000	$135,992,000
Truck Staging Areas	$-	$2,251,000	$3,127,000	$948,000	$6,326,000
Federal Facilities	$-	$163,783,000	$-	$-	$163,783,000
Subtotal (Cargo)	**$56,619,000**	**$368,181,000**	**$317,837,000**	**$53,760,000**	**$796,397,000**
Aviation Support Facilities					
MDAD Facilities	$88,136,000	$-	$-	$-	$88,136,000
Fuel Farm Expansion	$12,200,000	$-	$8,000,000	$8,000,000	$28,200,000
Ground Services Equipment Storage and Maintenance	$56,373,000	$56,373,000	$-	$-	$112,746,000
Subtotal (Support)	**$156,709,000**	**$56,373,000**	**$8,000,000**	**$8,000,000**	**$229,082,000**
MRO Facilities [3/]	$-	$-	$-	$-	$-
Total	**$867,597,000**	**$1,717,794,000**	**$1,328,352,000**	**$948,419,000**	**$4,862,162,000**

NOTES:

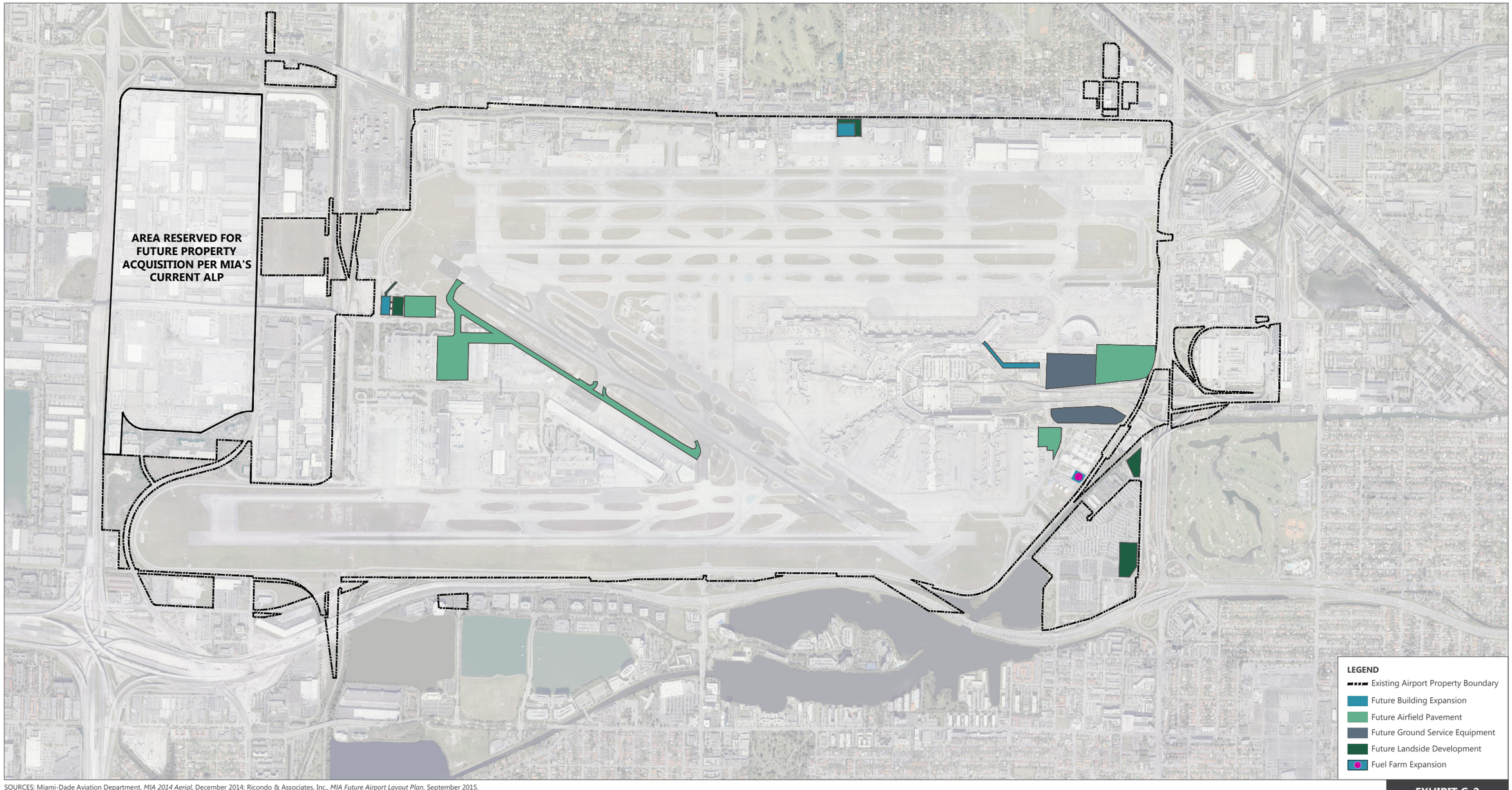
TBD = To Be Determined

1/ Costs associated with the Taxiway R realignment are pending the preparation of cost estimates by RIB U.S. Cost, Inc.

2/ Aircraft maintenance, repair, and overhaul facilities are to be funded by a third party developer.

SOURCES: URS Corporation, Construction Costs, April 2014; T. Y. Lin International, Inc., *MIA Taxi Lot Relocation Project Book*, July 2015; RIB U.S. Cost, Inc., September 2015; Miami-Dade Aviation Department, MIA Fuel System Master Plan Update, June, 2015; Ricondo & Associates, Inc., SMP Technical Analyses, November 2012 through August, 2014.

PREPARED BY: Ricondo & Associates, Inc., November 2015.



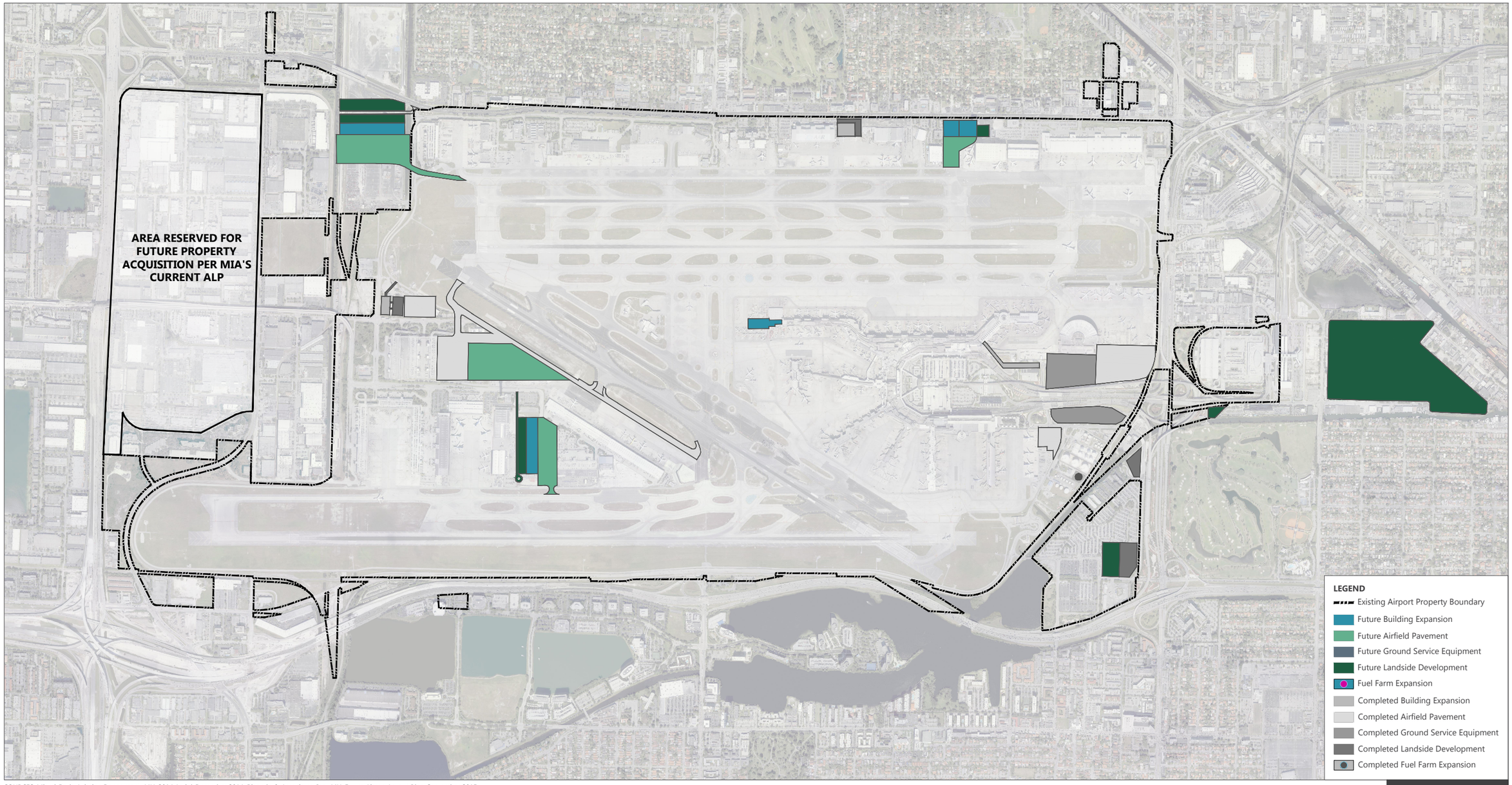
SOURCES: Miami-Dade Aviation Department, *MIA 2014 Aerial,* December 2014; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan,* September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT G-2

NORTH 0 1,700 ft.

Phase 1 Development 2016-2020

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Option 2 Staging 20180320.dwgLayout: Phase 1 Plotted: Mar 20, 2018, 02:50PM



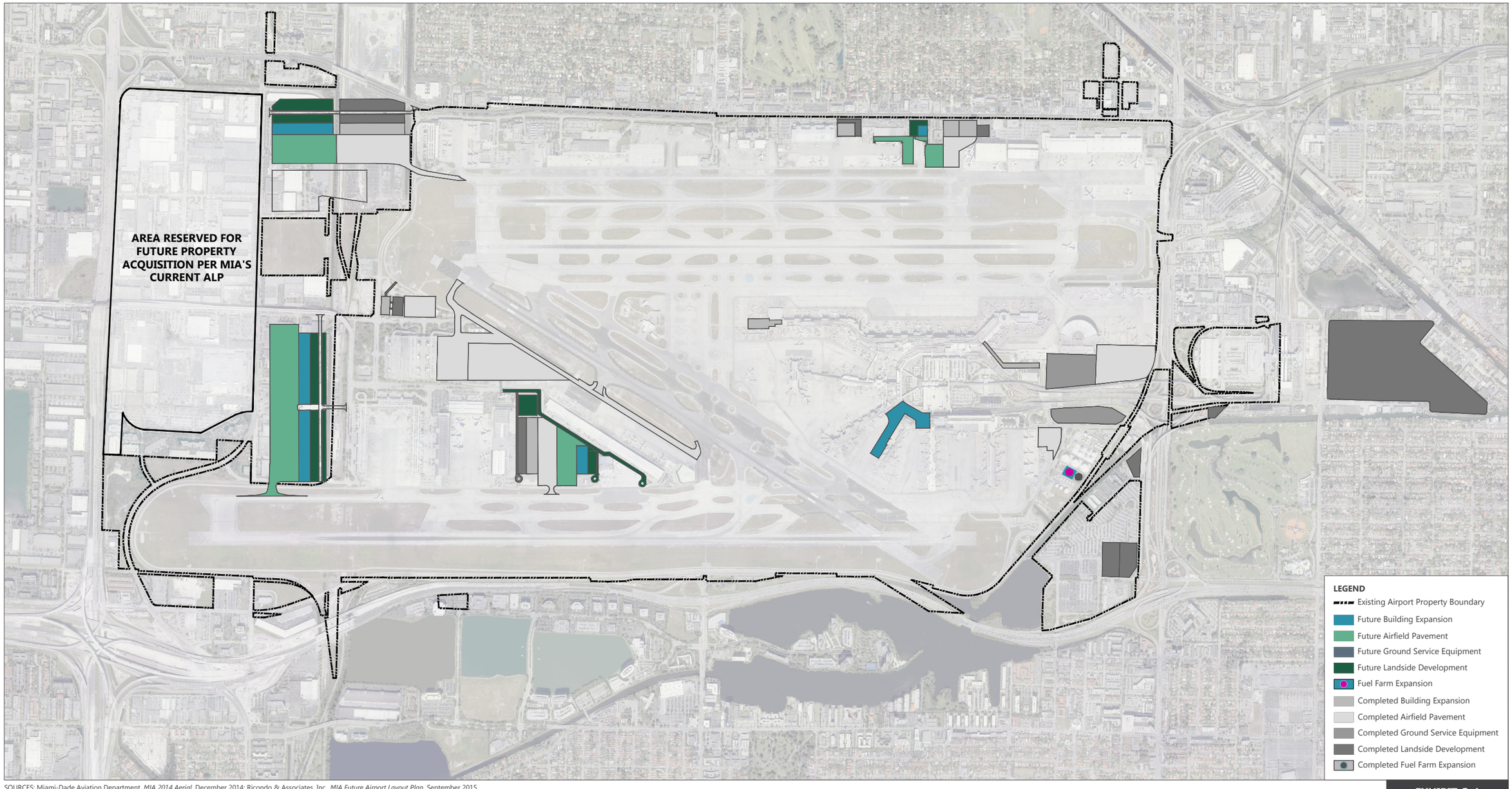
SOURCES: Miami-Dade Aviation Department, *MIA 2014 Aerial,* December 2014; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan,* September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT G-3

NORTH 0 1,700 ft.

Phase 2 Development 2021-2025

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Option 2 Staging 20180320.dwgLayout: Phase 2 Plotted: Mar 20, 2018, 02:50PM



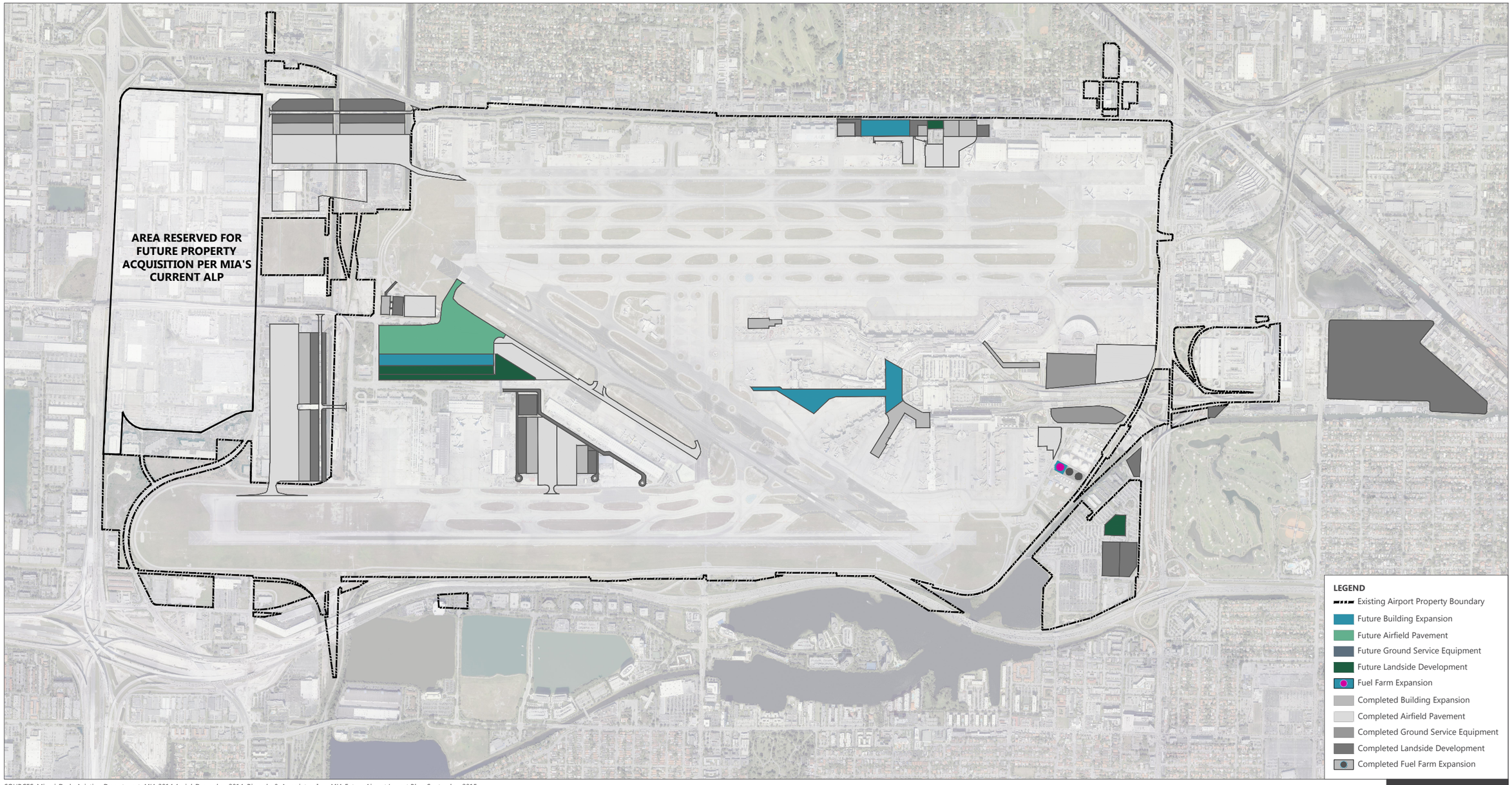
SOURCES: Miami-Dade Aviation Department, *MIA 2014 Aerial,* December 2014; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan,* September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT G-4

NORTH 0 1,700 ft.

Phase 3 Development 2026-2030

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Option 2 Staging 20180320.dwgLayout: Phase 3 Plotted: Mar 20, 2018, 02:51PM



SOURCES: Miami-Dade Aviation Department, *MIA 2014 Aerial,* December 2014; Ricondo & Associates, Inc., *MIA Future Airport Layout Plan,* September 2015.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT G-5

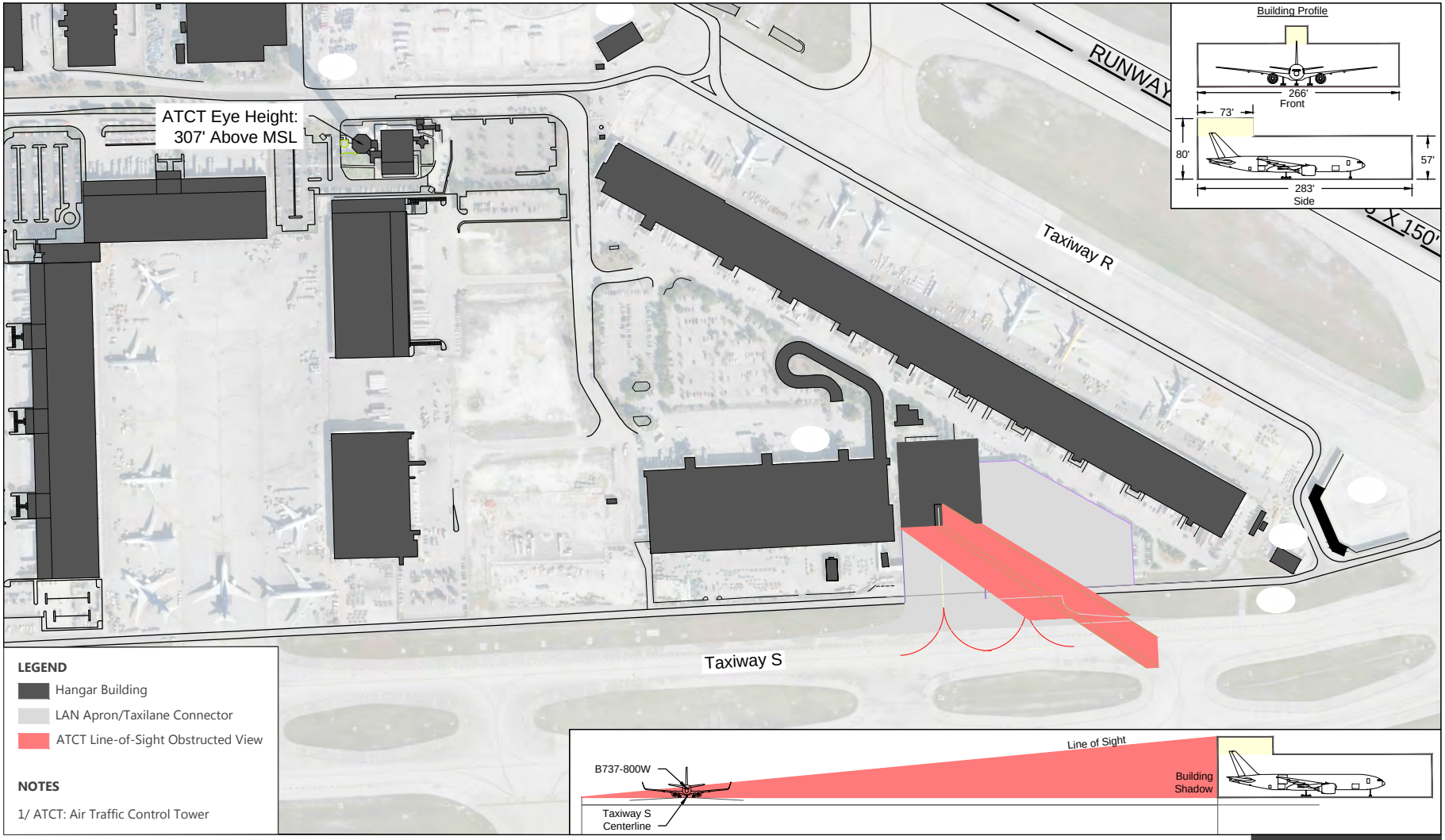
NORTH 0 1,700 ft.

Phase 4 Development 2031-2035

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Option 2 Staging 20180320.dwgLayout: Phase 4 Plotted: Mar 20, 2018, 02:52PM

H. Shadow or Line-of-Sight Study

Ongoing construction of the LAN aircraft maintenance hangar will obstruct the ATC line-of-sight to Taxiway S. **Exhibit H-1** illustrates the shadow results from the LAN hangar. No other obstructions to the ATC line-of-sight exist and none are anticipated as a result of the proposed development depicted on the future ALP drawing.



SOURCE: Aerial Cartographics of America, Inc., *MIA 2015 Planimetrics*, July 2015; Miami-Dade Aviation Department, *Proposed LAN Hangar Shadow Study*, September 2012.
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT H-1

NORTH 0 500 ft.

Air Traffic Control Line-of-Sight Shadow
LAN Aircraft Maintenance Hangar

Drawing: P:\MDAD\Strategic MP\Phase 4 Tasks\4L - MIA Airport Plans Package\CAD\Narrative Report Exhibits\Proposed LAN Revised angar Shadow RE 1.dwg Layout: Layout1 Plotted: Nov 18, 2015, 11:3 AM

I. Letters of Coordination

This section does not apply to this ALP Narrative as no coordination with outside agencies was conducted.

J. Wildlife Hazard Management

A Wildlife Hazard Assessment (WHA) was initially completed in 2001 and subsequently revised in 2009 pursuant to Safety Recommendation A-09-073, issued by the National Transportation Safety Board to the FAA on April 29, 2009. The WHA addresses the baseline conditions at the Airport and recommends implementing actions to reduce the likelihood of future wildlife strikes and create a safer operating environment. Recommendations were identified at various points throughout the assessment and documented in the WHA report.

The WHA for MIA concludes that the current wildlife hazard management practices are effective and therefore the Airport does not have a severe wildlife hazard problem. With the exception of the Florida burrowing owl, wildlife at MIA is primarily comprised of transients that are attracted to the turf areas and drainage features.

K. Preliminary Identification of Environmental Features

Exhibits K-1 through **K-7** illustrate the various environmental features at MIA and within the surrounding environs. **Table K-1** summarizes the potential environmental impacts associated with the proposed development depicted on the Future ALP and the proposed mitigation approach for those areas that may be directly impacted. As shown, these impacts are limited to encroachment of two existing canals within the Airport property boundary, which would be converted into a box culvert to allow for the realignment of Taxiway R and the expansion of the remote aircraft parking hardstands to the east of the North Terminal Complex.

Table K-1: Summary of Potential Environmental Impacts

ENVIRONMENTAL FEATURE	DESCRIPTION OF POTENTIAL IMPACTS	MITIGATION APPROACH
Major Drainage Ditches	Taxiway R Relocation Aircraft Hardstand Expansion	Convert Canal to Box Culvert Convert Canal to Box Culvert
Wetlands	No Direct Impacts	N/A
Flood Zones	Cargo Expansion (Zone AH)	Grading and Drainage as Required
Historical or Cultural Resources	No Direct Impacts	N/A
DOT Section 4(f) Features	No Direct Impacts	N/A
Flora/Fauna	No Direct Impacts	N/A
Natural Resources	No Direct Impacts	N/A
Other Features	None Identified	N/A

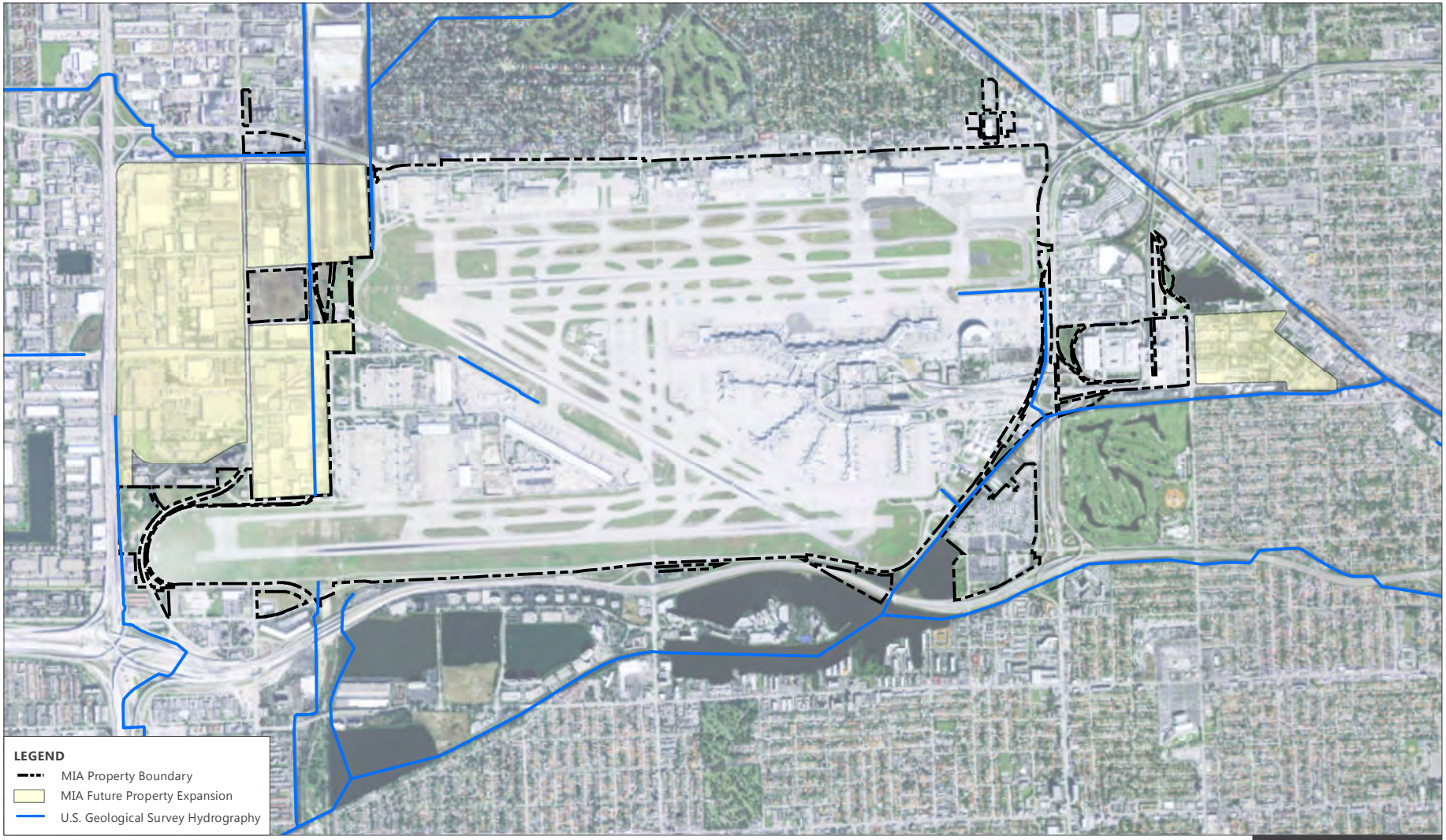
NOTES:

N/A = Not Applicable

Flood Zone AH – Zone that corresponds to the areas of the 100-year shallow flooding with a constant water-surface elevation where average depths are between 1 and 3 feet. Mandatory flood insurance purchase requirements apply.

SOURCES: Miami-Dade Aviation Department; ESRI Database: Esri, DigitalGlobe, GeoEYE, i-cubed, United States Department of Agriculture, AEX, Getmapping, Aerogrid, IGN, swisstopo, and the GIS User Community (Aerial Photography), 2015; Florida Geographic Data Library, GIS Metadata Explorer; GIS Data, http://www.fgdl.org/metadataexplorer/explorer.jsp (accessed September 29, 2015); United States Geological Survey, GIS Data: Hydrography, http://nhd.usgs.gov/data.html (accessed September 25, 2015; Miami-Dade County GIS Data;

PREPARED BY: Ricondo & Associates, Inc., November 2015



SOURCE: Miami-Dade County Aviation Department; ESRI Database: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, (Aerial Photography), 2015; U.S. Geological Survey, GIS Data: Hydrography, http://nhd.usgs.gov/data.html, (accessed: September 25, 2015).
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT K-1

NORTH

0 3,000 ft.

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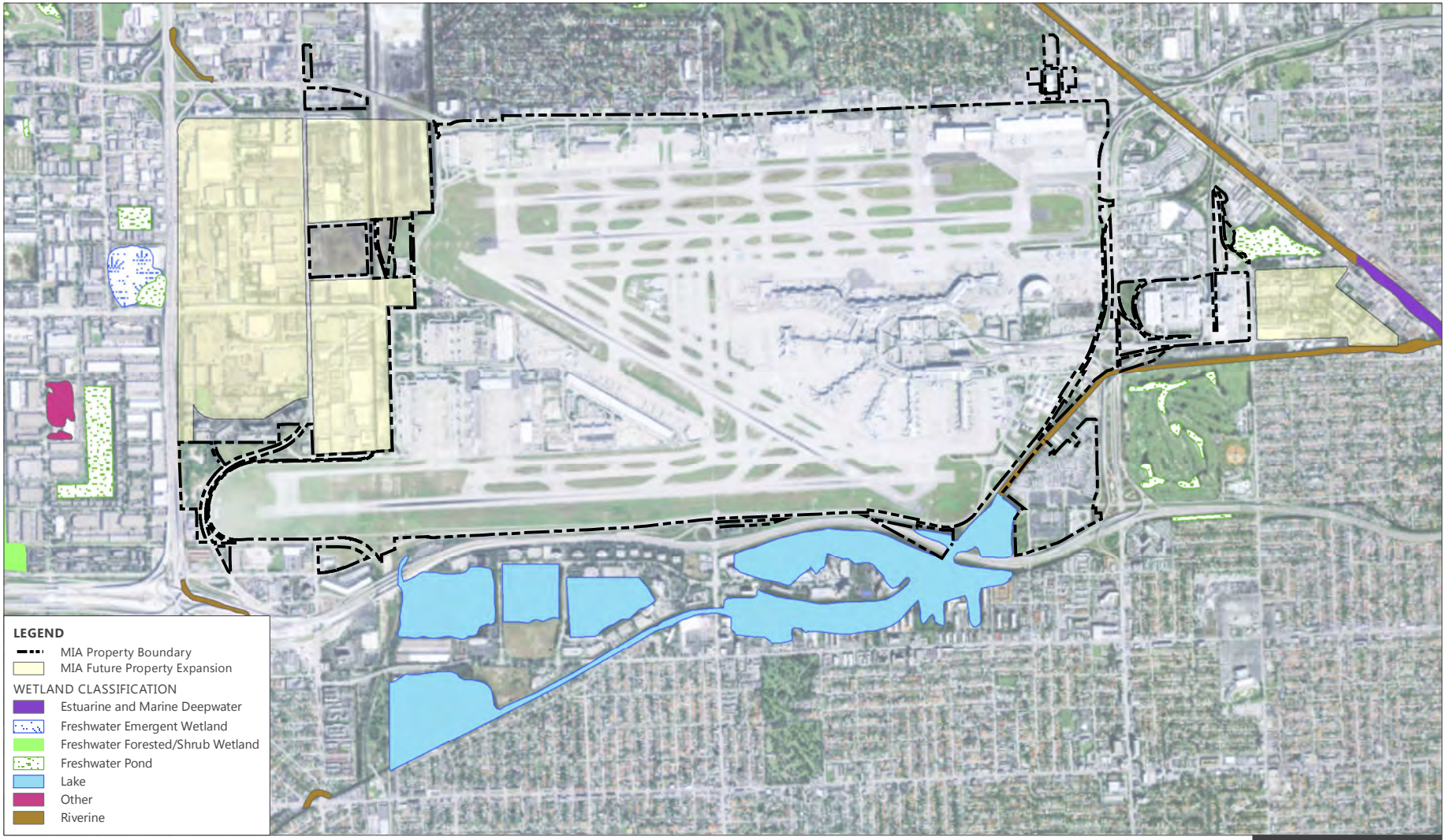
Major Drainage Ditches



SOURCE: Miami-Dade County Aviation Department; ESRI Database: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, (Aerial Photography), 2015; Florida Geographic Data Library, GIS Metadata Explorer: GIS Data, http://www.fgdl.org/metadataexplorer/explorer.jsp, (accessed, September 29, 2015);
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT K-2

NORTH 0 3,000 ft.

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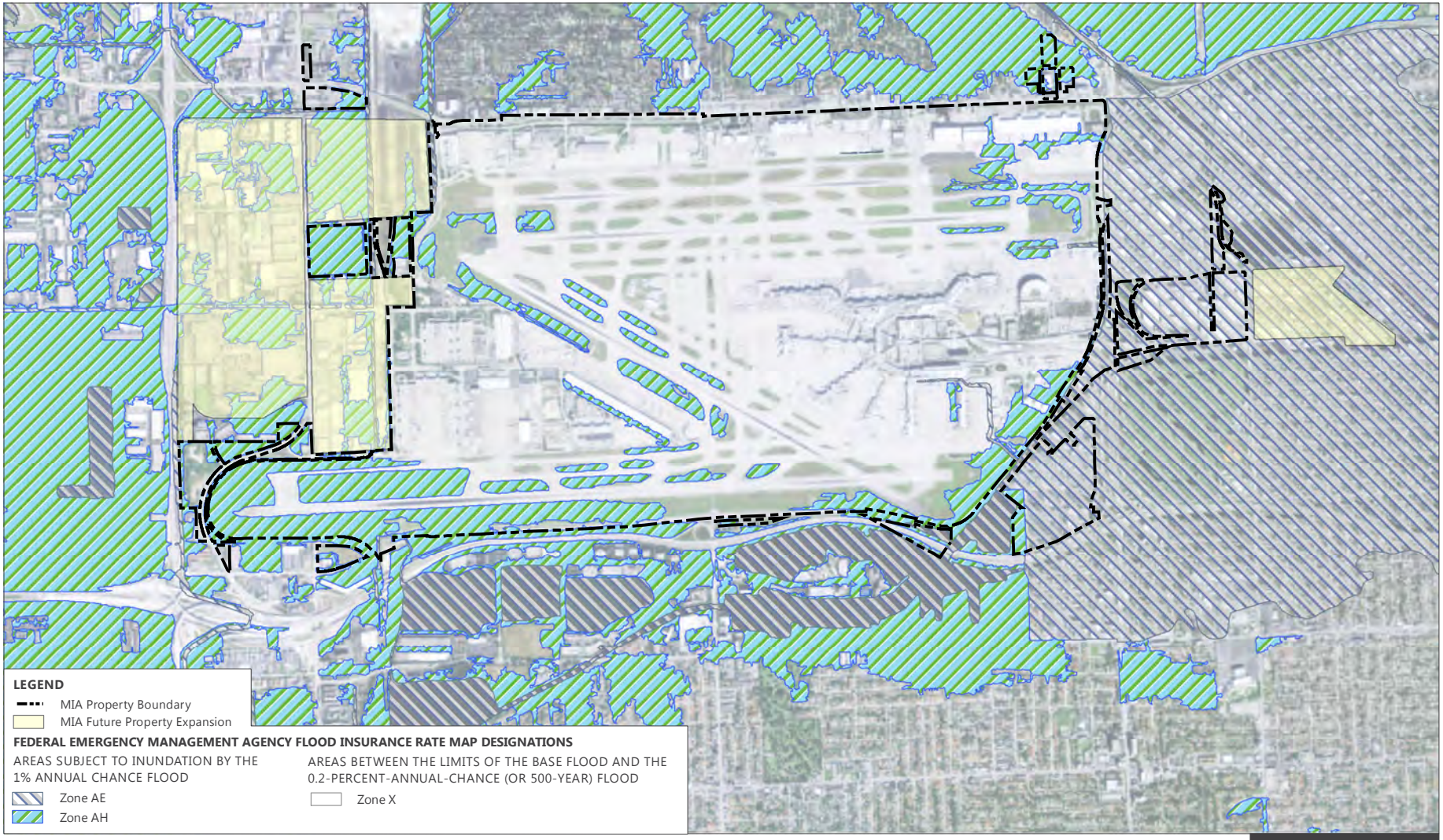
Wetlands



SOURCE: Miami-Dade County Aviation Department; ESRI Database: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, (Aerial Photography), 2015; Florida Geographic Data Library, GIS Metadata Explorer: GIS Data, http://www.fgdl.org/metadataexplorer/explorer.jsp, (accessed, September 29, 2015);
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT K-3

NORTH 0 3,000 ft.

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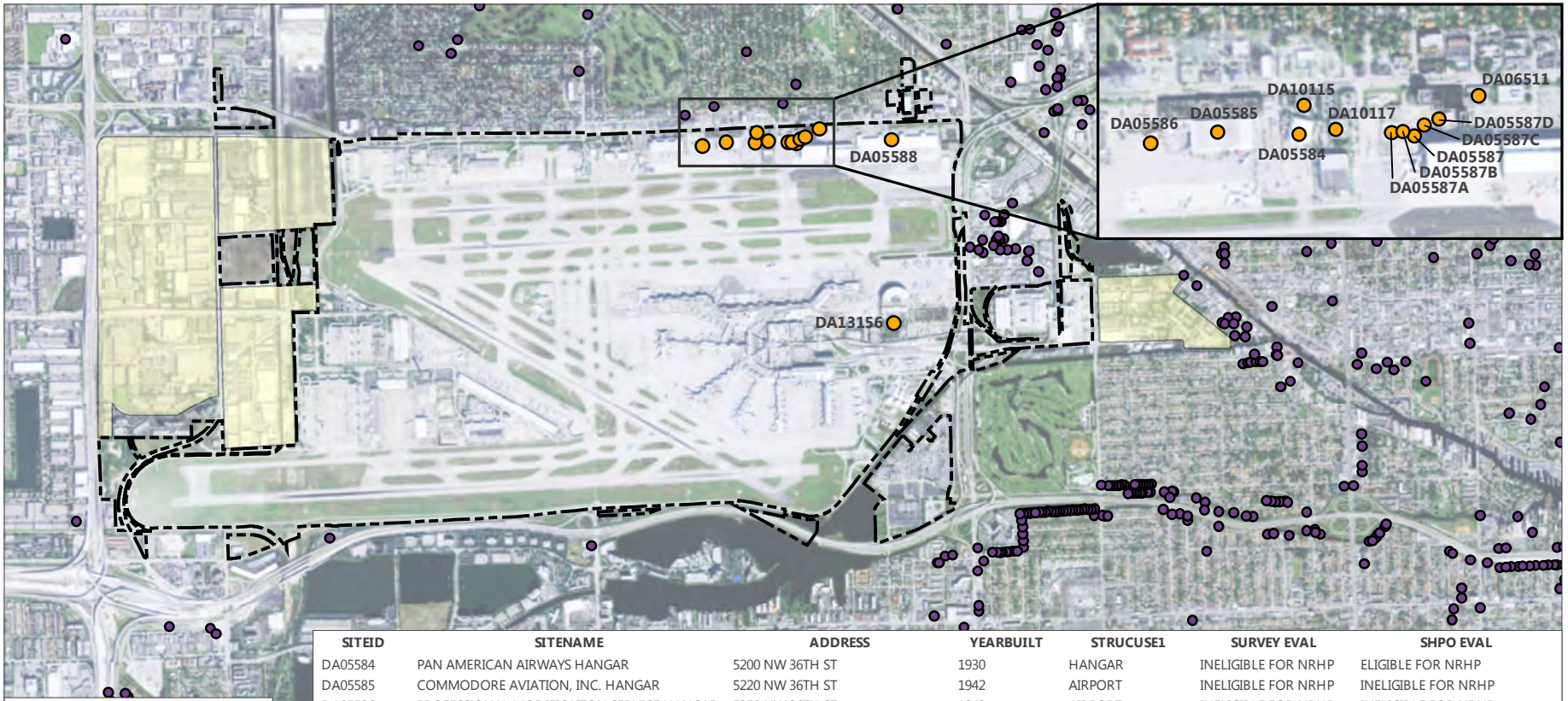
Flood Zones



SITEID	SITENAME	ADDRESS	YEARBUILT	STRUCUSE1	SURVEY EVAL	SHPO EVAL
DA05584	PAN AMERICAN AIRWAYS HANGAR	5200 NW 36TH ST	1930	HANGAR	INELIGIBLE FOR NRHP	ELIGIBLE FOR NRHP
DA05585	COMMODORE AVIATION, INC. HANGAR	5220 NW 36TH ST	1942	AIRPORT	INELIGIBLE FOR NRHP	INELIGIBLE FOR NRHP
DA05586	PROFESSIONAL MODIFICATION SERVICE HANGAR	5350 NW 36TH ST	1943	AIRPORT	INELIGIBLE FOR NRHP	INELIGIBLE FOR NRHP
DA05587	WORLD AIRWAYS	MIAMI INTERNATIONAL AIRPORT	1928	HANGAR	INELIGIBLE FOR NRHP	INELIGIBLE FOR NRHP
DA05587A	BUILDING 885 (OLD NUMBER 39)	4800 NW 36TH ST	1951	AIRPORT	INELIGIBLE FOR NRHP	NOT EVALUATED BY SHPO
DA05587B	BUILDING 886 (OLD NUMBER 38)	4800 NW 36TH ST	1929	HANGAR	INELIGIBLE FOR NRHP	NOT EVALUATED BY SHPO
DA05587C	BUILDING 887 (OLD NUMBER 37)	4800 NW 36TH ST	1944	OTHER	INELIGIBLE FOR NRHP	NOT EVALUATED BY SHPO
DA05587D	BUILDING 888 (OLD NUMBER 35 & 35A)	4800 NW 36TH ST	1929	HANGAR	INELIGIBLE FOR NRHP	NOT EVALUATED BY SHPO
DA05588	WINGS AVIATION	4400 NW 36TH ST	1941	HANGAR	INELIGIBLE FOR NRHP	INELIGIBLE FOR NRHP
DA06511	BLDG 883	4630 NW 36TH ST	1952	WAREHOUSE	INELIGIBLE FOR NRHP	INSUFFICIENT INFORMATION
DA10115	BLDG 870 (OLD # 49) OFFICE & SHOP	5020 NW 36TH ST	1943	OFFICE	INELIGIBLE FOR NRHP	INSUFFICIENT INFORMATION
DA10117	BLDG 874 (OLD # 44) OFFICES	4900 NW 36TH ST	1963	OFFICE	INELIGIBLE FOR NRHP	INSUFFICIENT INFORMATION

LEGEND

- MIA Property Boundary
- MIA Future Property Expansion

WETLAND CLASSIFICATION

- State Historic Preservation Office (SHPO) Cultural Resources
- State Historic Preservation Office (SHPO) Cultural Resources Within MIA Boundary (See Table)

SOURCE: Miami-Dade County Aviation Department; ESRI Database: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, (Aerial Photography), 2015; Florida Geographic Data Library, GIS Metadata Explorer: GIS Data, http://www.fgdl.org/metadataexplorer/explorer.jsp, (accessed, September 29, 2015);
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT K-4

NORTH 0 3,500 ft.

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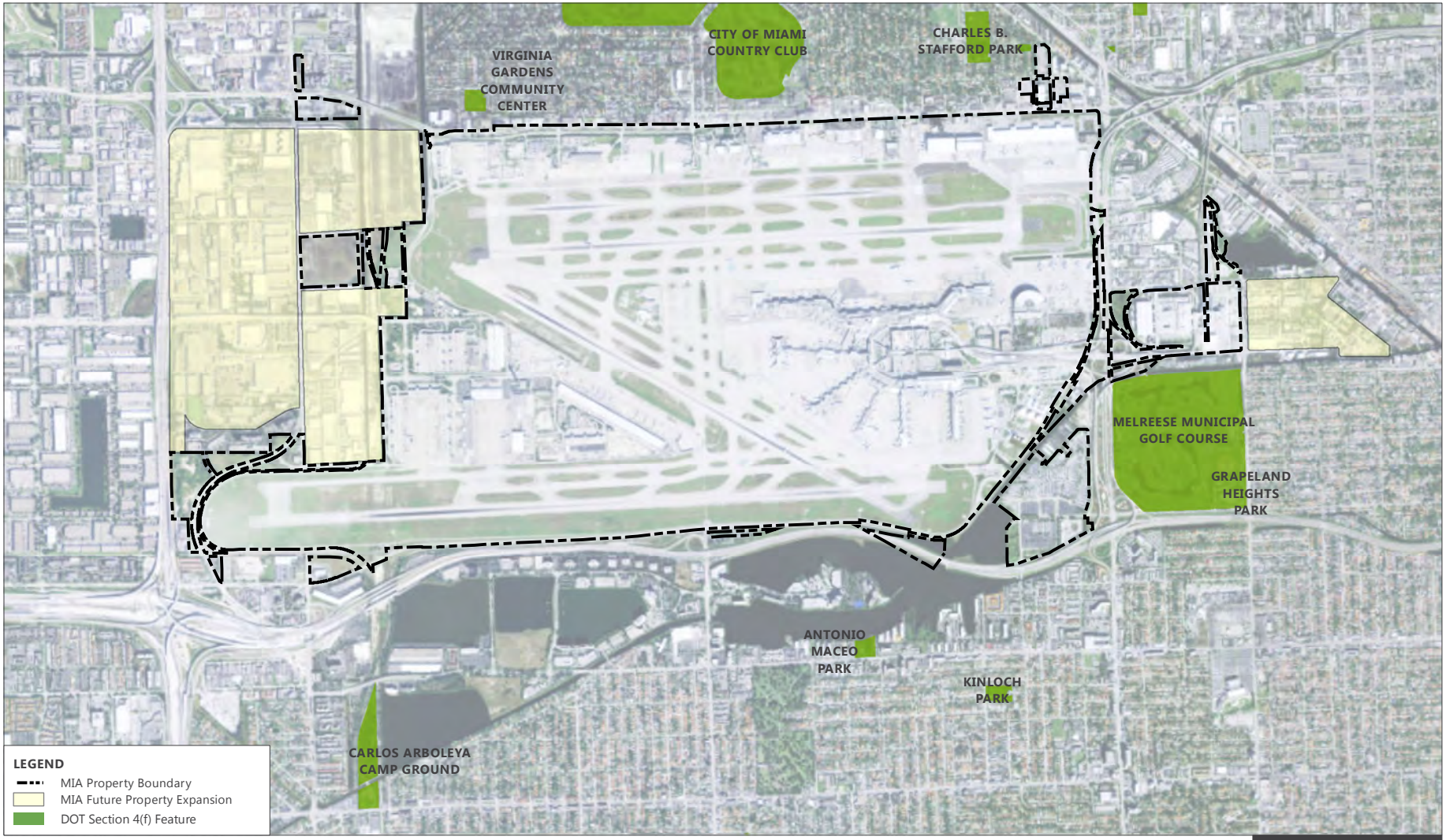
Cultural Resources



SOURCE: Miami-Dade County Aviation Department; ESRI Database: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, (Aerial Photography), 2015; Miami-Dade County, GIS Data;
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT K-5

NORTH 0 3,000 ft.

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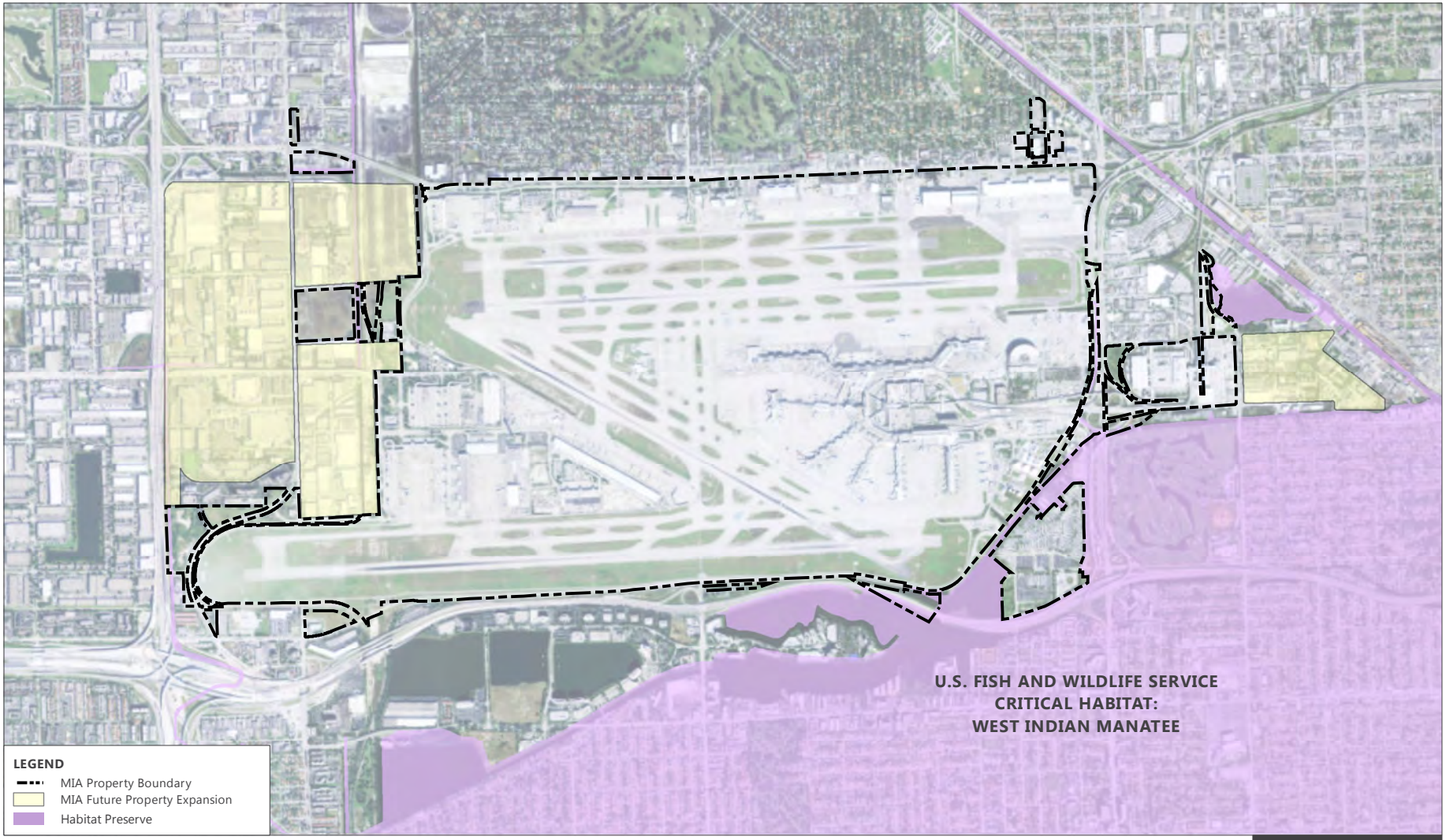
Department of Transportation (DOT) Section 4(f) Features



SOURCE: Miami-Dade County Aviation Department; ESRI Database: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, (Aerial Photography), 2015; Florida Geographic Data Library, GIS Metadata Explorer: GIS Data, http://www.fgdl.org/metadataexplorer/explorer.jsp, (accessed, September 29, 2015); U.S. Fish and Wildlife Service, GIS Data: Critical Habitat, http://ecos.fws.gov/crithab/, (accessed: September 29, 2015).
PREPARED BY: Ricondo & Associates, Inc., September 2015.

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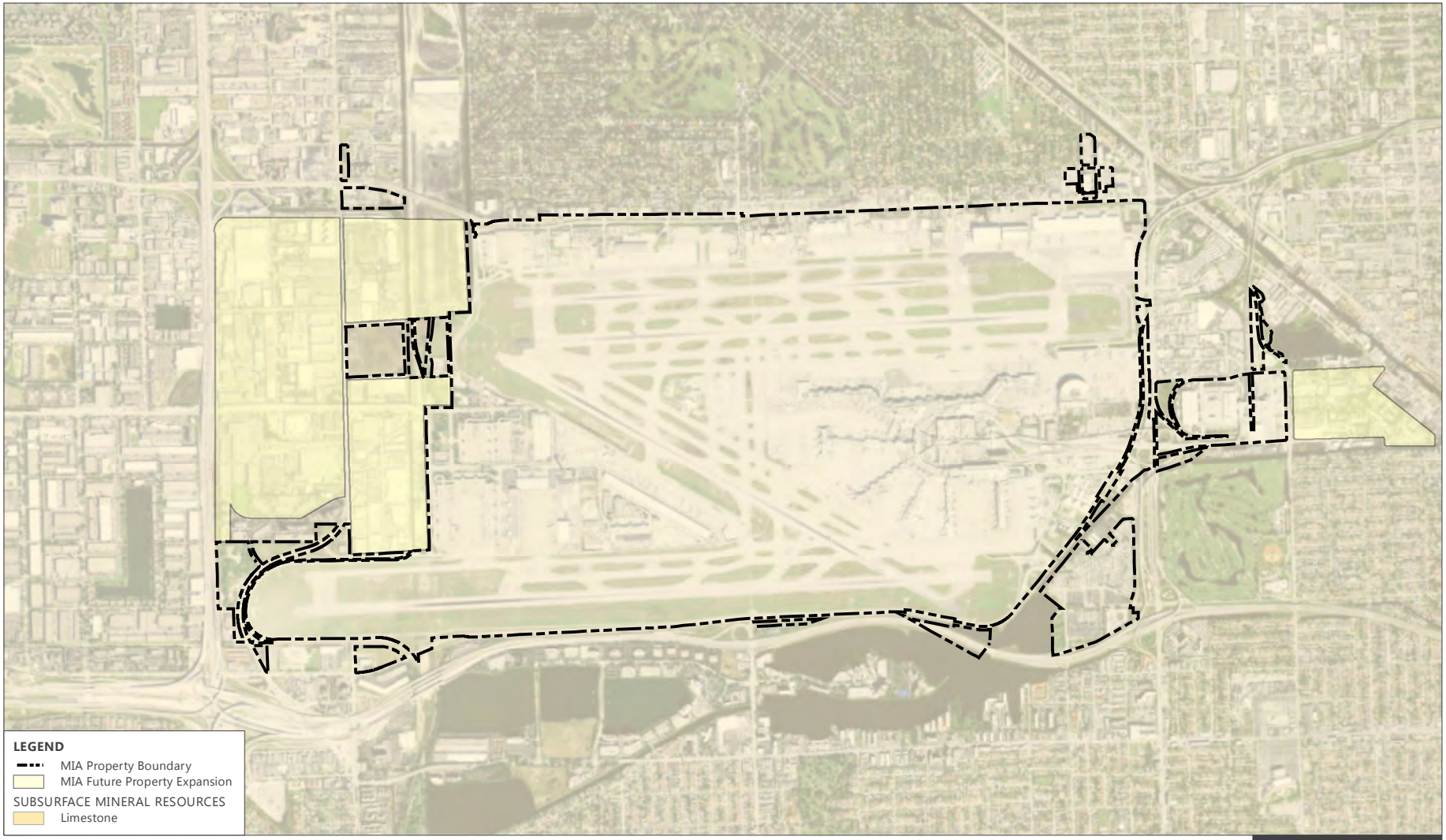
EXHIBIT K-6

Flora and Fauna



SOURCE: Miami-Dade County Aviation Department; ESRI Database: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, (Aerial Photography), 2015; Florida Geographic Data Library, GIS Metadata Explorer: GIS Data, http://www.fgdl.org/metadataexplorer/explorer.jsp, (accessed, September 29, 2015);
PREPARED BY: Ricondo & Associates, Inc., September 2015.

EXHIBIT K-7

NORTH 0 3,000 ft.

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Natural Resources

L. Action Items from FAA Runway Safety Program Office

On behalf of the FAA Runway Safety Program Office, the FAA's Orlando Airports District Office requested that MDAD evaluate opportunities to mitigate three specific areas that were identified through the runway incursion mitigation analysis for MIA. The three areas include:

- MIA-02 – Runway 8R-26L exit Taxiway M5
- MIA-38 – Runway 12-30 crossing at Taxiway T (eastbound taxiing flows)
- MIA Hot Spot #4 – Runway 12-30 crossing at Taxiway S (eastbound taxiing flows)

On July 31, 2015, MDAD submitted an email response to this request describing potential mitigation options and providing rough-order-of-magnitude cost estimates. The mitigation options include the potential reconfiguration of Taxiway M5 and Taxiway T5 into perpendicular exit taxiways with standard pavement geometry. Both improvements are depicted on the Future ALP.

With the recent improvements to Runway 12-30, runway status lights were installed at the Taxiway T and Taxiway S crossings. In addition, the Taxiway S centerline marking east of Runway 12-30 was realigned to create a crossing point perpendicular to the Runway 12-30 centerline. The hold position markings on Taxiways T and S were also reconfigured to enhance pilot situational awareness when crossing Runway 12-30 from the east. Based on conversations with FAA Air traffic Control (ATC) staff at MIA and MDAD Operations personnel, no runway incursion have occurred at these two locations since these improvements were implemented. The reconfiguration of Taxiway T5 would likely be implemented when Runway 9-27 undergoes rehabilitation or reconstruction, assuming it is not determined that Taxiway T5 reconfiguration needs to be accelerated and completed as its own stand-alone project.

Implementation of the proposed modification to Taxiway M5 is dependent on FAA funding eligibility and the updating and approval of the 10-year Capital Improvement Program for MIA by MDAD staff. For planning purposes, it is anticipated that Taxiway M5 would be modified prior to PAL 1 (2025).

M. Declared Distances

Declared distances tables are used to aid in identifying the maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing distance performance requirements for turbine powered aircraft. The takeoff run available (TORA), takeoff distance available (TODA), accelerate-stop distance available (ASDA), and landing distance available (LDA) for Runways 8L, 26R, 8R and 26L remain the same. The TORA, TODA, ASDA and LDA for Runways 9, 27 12 and 30 vary. These values are listed in **Table M-1**.

Table M-1: Miami International Airport – Declared Distances (in square feet)

	TORA		TODA		ASDA		LDA	
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
Runway 8L	8,600	Same	8,600	Same	8,600	Same	8,600	Same
Runway 26R	8,600	Same	8,600	Same	8,600	Same	8,600	Same
Runway 8R	10,506	Same	10,506	Same	10,506	Same	10,506	Same
Runway 26L	10,506	Same	10,506	Same	10,506	Same	10,506	Same
Runway 9	13,016	Same	13,016	Same	12,755	Same	11,397	Same
Runway 27	13,016	Same	13,016	Same	13,016	Same	12,755	Same
Runway 12 (13)	9,355	Same	9,355	Same	8,579	Same	8,579	Same
Runway 30 (31)	9,355	Same	9,355	Same	8,853	Same	7,913	Same

SOURCE: Ricondo & Associates, Inc., September 2015.
PREPARED BY: Ricondo & Associates, Inc., November 2015.

N. Airport Layout Plan Drawings

This section provides a brief description of the information specific to each of the drawing sheets in the ALP set. These drawings were developed and produced as a set on 42 inch by 30 inch sheets using AutoCAD 2014 software. To provide vertical and horizontal accuracy for the ALP set, a digitized map was developed by Aerial Cartographics of America and was used as a base for all the drawings. The aerial image was created in 2014. The coordinates, elevations, and aerial photogrammetry are in U.S. survey feet. The horizontal datum is the Florida State Plane Coordinate System, East Zone, North American Datum of 1983/1990 adjustment (NAD 83/90). The vertical datum is the North American Vertical Datum of 1988 (NAVD 88).

Reduced reproductions of these drawings are included in Appendix B to this report for illustration purposes. A full-size set of the drawings will be submitted along with this report to the FAA and FDOT for review and acceptance. An ALP set provides guidance on the direction for future development possibilities on Airport property.

N.1 Title Sheet

Sheet 1, the Title Sheet, lists the drawings within the ALP set. It also provides a location and vicinity map. The location map is a scaled representation of location of the Airport in the State of Florida, and the vicinity map shows the approximate location of the Airport, its boundaries, and major roadways. The vicinity map also depicts the roadway system serving the Airport and the local community.

N.2 Airport Data Sheet

Sheet 2, the Airport Data Sheet, contains four data tables and a list of abbreviations used throughout the ALP set.

- **Airport Data Table –** This table lists existing and future information specific to the Airport, such as Airport elevation, service level, role, reference code, critical aircraft, owner, Airport reference point, temperature information, and available navigational aids.
- **Runway Data Table –** This table is a compiled tabulation of information relating specifically to the four runways at the Airport. Various specifications are listed for each existing and future runway, including, but not limited to, runway location, dimensions, ADG, available lighting and navigational aids, declared distances, and safety areas as defined in FAA AC 150/5300-13A (Change 1), *Airport Design*.

- **Taxiway Data Table** – This table provides information associated with the existing and future taxiways at the Airport, including, but not limited to, taxiway width, shoulder width, and taxiway safety area and object free area sizes.
- **Wind Rose and Wind Coverage Table –** The sheet also includes the Airport wind roses. The wind data depicted on this sheet were obtained from the National Oceanic and Atmospheric Administration's National Climatic Data Center. Wind data are provided for all weather conditions, visual meteorological conditions (ceiling at or above 1,000 feet and visibility greater than or equal to 3 miles), and instrument meteorological conditions (ceiling below 1,000 feet and/or visibility less than 3 miles). These components provide information on the percentage of time a runway end or a combination of runway ends or runways are available for arrivals. When combined, the coverage is intended to be as near as possible to 100 percent. Wind coverage is summarized for each runway end and combination of runway ends. Historical wind data were obtained for MIA for the 10-year period beginning in January 2005 and ending in December 2014.
- **Abbreviations –**A list of abbreviations explains all the abbreviations used in the ALP set.

N.3 Existing Airport Layout Plan

Sheet 3 provides the Existing ALP, which depicts existing conditions at the Airport The ALP sheet illustrates the Airport in its entirety at a scale of 1 inch = 400 feet. Major features of the ALP include runways, taxiways, aprons, navigational aids, existing facilities, the roadway system, and non-Airport facilities surrounding Airport property. This drawing also includes information from the data sheet for runway approaches, runway end elevations, runway high and low points, true azimuths for each runway, and the angle of declination (magnetic north), including the annual rate of change for the magnetic declination. The Existing ALP also includes pertinent clearance and dimensional information associated with the runways and taxiways, such as runway safety areas and RPZs. Imaginary elements are also included on the drawing sheet, including the Airport reference point (existing/future), ground contours, and other dimensional data recommended by the FAA. The ALP demonstrates the Airport's compliance with standards set forth in FAA AC 150/5300-13A (Change 1), *Airport Design,* or necessary modifications to those standards. The ALP sheet also contains the MOS table. This table lists any approved modifications to applicable design standards or any nonstandard conditions that are depicted on the ALP or present at the Airport.

N.4 Future Airport Layout Plan

Sheet 4 provides the Future ALP, which depicts the proposed Airport development projects necessary to meet forecast demand over the 20 year planning horizon. The proposed development presented graphically on the Future ALP is consistent with those projects discussed in Section C of this document. Future facility and infrastructure improvements depicted on the Future ALP include:

- Airfield modifications
- Passenger terminal expansion and redevelopment

- Remote aircraft parking positions (hardstands)
- Cargo warehouse facilities
- Aircraft MRO facilities
- Fuel farm expansion
- Aviation support facilities
- Miscellaneous landside improvements

Together with the Airport Data Sheet (Sheet 2) and the Existing ALP (sheet 3), this sheet serves as an overview for the FAA and MDAD as grant and other federal funding for future improvements is considered.

N.5 Future Terminal Area Layout

Sheet 5 provides the Future Terminal Area Layout, which shows the redevelopment of the Central Terminal, including construction of two linear concourse piers as replacements for Concourses E, F, and G and Satellite E, as well as the central portion of the main terminal building. The Central Terminal will have a dedicated FIS facility and all gates on the two new concourses will have international arrivals capability. Concourse D will also be expanded to the east and west and all additional gates will also have international arrivals capability. The South Terminal will also be expanded to the west of Concourse H to accommodate for Checked Baggage Inspection Systems (CBIS)/Checked Baggage Reconciliation Areas (CBRA). The departure level and international arrival level (Levels 2 and 3) will also be expanded to the east of Concourse J. These proposed terminal improvements are anticipated to provide adequate capacity to serve PAL 2 (2035) passenger demand.

N.6 Airport Airspace Plans

Sheets 6 through 9 of the ALP set provide the Airport Airspace Plans, West and East, respectively. Sheet 8 and 9 show the Airport Airspace Plan Profile for Runways 9-27, 12-30, and Runway 8R-27L, 8L-26R respectively. To enhance the safe operation of aircraft in the airspace around an airport, the FAA has adopted 14 CFR Part 77, "Safe, Efficient Use, and Preservation of the Navigable Airspace." Subpart C of 14 CFR Part 77 establishes imaginary surfaces for determining obstructions to air navigation, which are illustrated on the Airport Airspace Plans. The Airport Airspace Plans also illustrate physical features on and around the Airport, including any existing obstructions that penetrate the 14 CFR Part 77 imaginary surfaces.

14 CFR Part 77 surfaces correspond to available navigational aids and types of approaches available to a runway end. **Table N-1** summarizes the 14 CFR Part 77 dimensions associated with each runway end at the Airport. The specific imaginary surfaces depicted on these drawing include:

- **Primary Surfaces** – Longitudinally centered on each runway, this surface extends 200 feet beyond each end of the runway and has an elevation equal to that of the runway centerline. The width of the primary surface is that prescribed for the most precise instrument approach procedure, existing or planned, for either end of the runway. The primary surfaces for MIA are 1,000 feet wide for Runways 8R-26L, 9-27, and 12-30 and 500 feet wide for Runway 8L-26R.
- **Approach Surfaces** – These surfaces are longitudinally centered along the extended centerline and extend outward and upward from each end of the primary surface. The size and slope of the approach surface are based on the type of approach, existing or planned, for that runway end. The inner edge of the approach surface is the same width as the primary surface. However, its overall length, slope, and outermost width may vary.
- **Transitional Surfaces** – These surfaces extend outward and upward from the lateral edges of all primary and approach surfaces at a slope of 7 to 1. The overall width of the transitional surfaces is 5,000 feet, which is measured perpendicularly from the runway centerline.
- **Horizontal Surface** – This surface is a plane located 150 feet above the established Airport elevation. Its perimeter consists of arcs of specific radii connected by lines tangential to the arcs. The arcs are centered on the midpoint of the ends of all primary surfaces.
- **Conical Surface** – This surface extends outward and upward from the periphery of the horizontal surface at a slope of 20:1, for a horizontal distance of 4,000 feet.

Table N-1: Miami international Airport - 14 CFR Part 77 Imaginary Surfaces by Runway End

	RUNWAY APPROACH END			
	RUNWAY 8L/26R	**RUNWAY 8R/26L**	**RUNWAY 9/27**	**RUNWAY 12/30**
Approach Type[1/]	N/N	P/P	P/P	P/P
Primary Surface Width (feet)	1,000	1,000	1,000	1,000
Horizontal Surface Radius (feet)	10,000	10,000	10,000	10,000
Approach Surface Width (inner) (feet)	1,000	1,000	1,000	1,000
Approach Surface Width (outer) (feet)	16,000	16,000	16,000	16,000
Approach Surface Length (feet)	50,000	50,000	50,000	50,000
Approach Slope	34:1	50:1/40:1	50:1/40:1	50:1/40:1

NOTE:

1/ P = Precision; N = Non-Precision

SOURCES: Title 14, Code of Federal Regulations, Part 77, "Safe, Efficient Use, and Preservation of the Navigable Airspace," e-CFR data current as of September 9,, 2015; Federal Aviation Administration, *Airport/Facility Directory*, January 18, 2015.

PREPARED BY: Ricondo & Associates, Inc., November 2015.

These sheets also identify the objects/obstructions to these surfaces. Currently, 159 obstructions to 14 CFR Part 77 surfaces have been identified for MIA. Of these 159 obstructions, two are in the approach surface, 49

are in the primary surface, 29 are in the horizontal surface, five in the conical surface and 74 are in the transitional surface.

N.7 Runway Centerline Profiles

Sheet 10 of the ALP set provides the Runway Centerline Profiles, which include a profile view of the existing runway alignment delineating the runway line-of-sight attributes. The Runway centerline profiles include runway end elevations, effective runway gradient, section gradient, touchdown zone elevations, runway safety areas, and runway high and low point elevations.

N.8 Runway Inner Approach Surfaces

Sheets 11 through 14 and 16 through 19 of the ALP set provide the inner portions of the Runway Approach Surfaces for Runways 8L-26R, 8R-26L, 12-30, and 9-27. These sheets consist of scaled drawings of the areas immediately beyond the existing runway ends at MIA, including, but not limited to, the RPZs off each runway end. The FAA recommends that the area within each RPZ be kept free of obstacles that could constitute a hazard to aircraft approaching or departing the airport. These drawings depict the location of roadways, structures, natural ground elevations, and other manmade or natural features within the limits of each RPZ or out to where the ultimate approach surface slope is 100 feet above the threshold elevation of the runway, whichever is further. The drawings also depict objects that penetrate existing and proposed approach surfaces or violate the primary surface criteria. In the inner portions of the runway approach surfaces at MIA, 219 penetrating obstructions were identified.

N.9 Departure Surfaces

Sheets 15 and 20 of the ALP set provide the Departure Surface drawings for Runways 8L-26R, 8R-26L, 12-30, and 9-27, respectively are prepared for each runway end with an existing or future instrument departure procedure. The sheets consist of scaled plan and profile drawings of the area within the 40:1 departure surface. The drawings depict the locations of potential obstructions. The sheets also include obstruction tables listing objects, departure surface penetrations, object top elevation, and disposition. 88 penetrating obstructions were identified in the Departure Surfaces at MIA

N.10 On-Airport Land Use Plan

Sheet 21 of the ALP set provides the On-Airport Land Use Plan. The On-Airport Airport Land Use Plan illustrates the proposed use of property within the current and expanded boundary of the Airport. This sheet identifies various land use designations for MDAD-owned Airport property, including the Air Operations Area (AOA) encompassing portions of the Airport used by aircraft. The land use areas, and their locations on and

around the airfield, are described below and are depicted using various patterns of hatching on the drawing sheet.

- **Air Cargo** – Includes cargo warehouses, aircraft parking aprons, GSE staging areas, loading docks, vehicle parking, and truck staging areas dedicated to the processing of belly cargo and air freight.
- **Aircraft Maintenance** – Includes facilities dedicated to aircraft maintenance, repair, and overhaul facilities at MIA. These facilities include aircraft maintenance hangars, apron areas, vehicle parking, parts storage, and associated shops and offices.
- **Aviation Support** – Includes fueling facilities, GSE storage and maintenance, Airport administration, and maintenance facilities.
- **Airside Operations Area** – Includes the land area reserved for activities supporting and sustaining the safe and efficient operation of aircraft, including land devoted to airfield facilities, such as runways and taxiways, and property within the limits of the RPZ, runway object free areas, and taxiway object free areas.
- **FAA/Government Facilities** – Includes areas dedicated to use by the FAA or other government agencies, such as the Department of Homeland Security, U.S. Customs and Border Protection, or U.S. Department of Agriculture.
- **General Aviation/Fixed Base Operator** – Includes land intended for existing and future general aviation-related development, such as aircraft hangars, FBOs, and aprons. Those portions of the Airport that are undeveloped or underdeveloped, and the potential for development for use by one or more forms of aviation, are identified.
- **Nonaeronautical** – Includes the area intended to represent development that is compatible with and may encourage aviation growth. Development may or may not be directly related to the aviation industry.
- **Parking/Transportation** – Includes area representing the landside functions that serve the passenger terminal facilities. These facilities include public/employee parking, cell phone waiting lot, taxicab staging area, bus loading/unloading areas, and the Miami Intermodal Center (which includes the rental car facilities) and terminal area roadways and curbfront.
- **Terminal Area** – Includes the passenger terminal facilities, concourses, and aircraft parking apron, including the adjacent remote aircraft parking (hardstand) positions.

N.11 Off-Airport Land Use Plan

Sheet 22 of the ALP set provides the Off-Airport Land Use Plan. The Off-Airport Land Use Plan drawing depicts the land uses within the vicinity of MIA. The land uses shown coincide with the 2015 Miami-Dade County Land Use Map issued by the Miami-Dade County Regulatory and Economic Resources Department's Research and Economic Analysis Section. The area exposed to aircraft noise of day-night average sound level (DNL) 65, expressed in A-weighted decibels, is also depicted on the Off-Airport Land Use Plan.

N.12 Airport Property Map and Legal Descriptions

Sheet 23 of the ALP set provides the Airport Property Map, which presents a historical chronology of all land conveyances associated with the Airport, as available from public records. Sheets 24 and 25 present the legal descriptions that are reflected on the Airport Property Map. These sheets illustrate the Airport property boundary and identify the various parcels that were acquired in the 1960s to create this boundary. The legal descriptions identify parcel information, such as the grantor, record data, acreage, date, etc. The Airport Property Map serves as a method of tracking current Airport property and as a document on which to depict and identify future property acquisition or easements that may be necessary for future Airport development.