

Chapter 10

Airport Layout Plan (ALP) Drawing Set

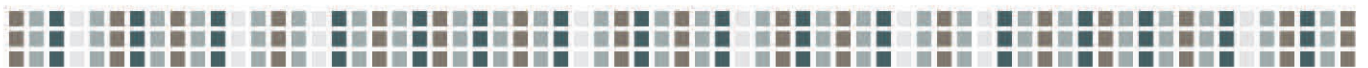


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10. Airport Layout Plan Drawing Set

This Airport Layout Plan (ALP) drawing set is a graphic representation of the preferred alternative development plan for Key West International Airport (EYW or Airport) through 2035. This section provides a brief description of each drawing in the ALP set which include the following sheets:

- Cover Sheet (1 of 13)
- Airport Data Sheet (2 of 13)
- Existing Airport Layout Plan (3 of 13)
- Future Airport Layout Plan (4 of 13)
- Ultimate Airport Layout Plan (5 of 13)
- 14 CFR Part 77 Airport Airspace Plan (6 of 13)
- 14 CFR Part 77 Airport Airspace Insets (7 of 13)
- 14 CFR Part 77 Airspace Data Sheet (8 of 13)
- Inner Portion of the Approach Surface Drawing – Runway 9 (9 of 13)
- Inner Portion of the Approach Surface Drawing – Runway 27 (10 of 13)
- Terminal Area Plan (11 of 13)
- Airport Land Use Plan (12 of 13)
- Airport Property Map (13 of 13)

The drawings stated above were produced using AutoCAD software with vertical and horizontal accuracy using a digitized map developed by Martinez Geospatial. This aerial image was flown in April 2016. The coordinates, elevations, and aerial photogrammetry are in U.S. survey feet. The horizontal datum is the Florida East State Plane Coordinate System, North American Datum of 1983/1990 adjustment (NAD 83/90). The vertical datum is the North American Vertical Datum of 1988 (NAVD 88). These drawings were developed and produced in 24-inch by 36-inch sheets. A full-size set of the drawings is being submitted with this report to the Federal Aviation Administration (FAA) and the Florida Department of Transportation (FDOT) for review and approval. **Appendix E** presents an ALP Review Checklist in accordance with FAA guidance found in Standard Operating Procedure 2.0, *Standard Procedure for FAA Review and Approval of Airport Layout Plans*.

The critical design aircraft is defined as the most demanding aircraft that will substantially use the Airport, with “substantially” defined as either 500 or more annual itinerant operations or scheduled service. Also, the critical design aircraft can be either a single aircraft or a composite of the most demanding characteristics of several aircraft.¹ The previous Master Plan identified the Boeing 737-700W as the critical aircraft for Runway 9/27. The Boeing 737-700W is a C-III aircraft.

10.1 Runway Design Code

The Runway Design Code (RDC) is a coding system described in FAA AC 150/5300-13A, *Airport Design, Change 1*; it is 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 for aircraft operating at or forecast to operate at an airport; the specifications are translated 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.

EYW has one runway: Runway 9/27. The following subsections describe the RDC for each runway end.

10.1.1 RUNWAY 9/27

- Aircraft Approach Category – From an approach speed standpoint, the Boeing 737-700W is the critical aircraft; this aircraft is categorized as AAC C.
- Airplane Design Group – Based on wingspan, the Boeing 737-700W is the critical aircraft; this aircraft is categorized as ADG III.
- Visibility Minimums – Both ends of Runway 9/27 are non-precision instrument (NPI) approaches, providing visibility minimums of 1-mile.

¹ Federal Aviation Administration, Advisory Circular 150/5000-XX, *Critical Aircraft and Regular Use Determination*, Draft.

10.2 Runway Reference Codes

The Runway Reference Codes, or the Approach Reference Code and the Departure Reference Code (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, Runway Design Code (AAC, ADG, and visibility minimums), whereas the DPRC consists of the AAC and ADG only. The APRC and DPRC coding system is described in FAA AC 150/5300-13A, *Airport Design, Change 1*.²

The APRC and DPRC are determined based on the existing runway-to-taxiway separation and visibility minimums. At EYW, the runway centerline separation from the associated full-length parallel Taxiway A centerline is 315 feet. The runway-to-taxiway separation combined with the visibility minimums result in APRCs of B/III/5000 and D/II/5000 for both ends of Runway 9/27. The ultimate APRCs for Runway 9/27 will remain the same. The DPRCs at EYW are B/III and D/II for both ends of Runway 9/27. The ultimate DPRCs for Runway 9/27 will remain the same. **Table 10.2-1** summarizes the APRCs and the DPRCs at EYW.

Table 10.2-1: EYW Approach and Departure Reference Codes

RUNWAY	EXISTING		ULTIMATE	
	APPROACH REFERENCE CODE (APRC)	DEPARTURE REFERENCE CODE (DPRC)	APPROACH REFERENCE CODE (APRC)	DEPARTURE REFERENCE CODE (DPRC)
9	B/II/5000; D/II/5000	B/II; D/II	Same	Same
27	B/II/5000; D/II/5000	B/II; D/II	Same	Same

SOURCES: Federal Aviation Administration, Advisory Circular 150/5300-13A, *Airport Design, Change 1*, §323, February 26, 2014.
PREPARED BY: Ricondo & Associates, Inc., October 2018.

10.3 Cover Sheet

The first sheet in the ALP drawing set is the Cover Sheet, which lists the drawings found within the ALP drawing set. A location map is provided showing the general location of the airport in relation to the State of Florida and a vicinity map is provided showing the location of the airport and major roads in the City of Key West. The names of the Monroe County Board of County Commissioners who represent the governing body of the airport is also included on this sheet.

² Federal Aviation Administration, Advisory Circular 150/5300-13A, *Airport Design, Change 1*, §323, February 26, 2014.

10.4 Airport Data Sheet

Sheet 2, the Airport Data Sheet, contains data tables and a list of abbreviations used throughout the ALP drawing set. The following tables are included on the airport data sheet:

- **Abbreviations** – A list of abbreviations used in the ALP drawing set.
- **Airport Data Table** – This table lists existing, future, and ultimate information specific to the Airport, such as airport property acreage, airport elevation, airport reference code, airport reference point, mean maximum temperature, design aircraft, Nav aids, airport magnetic variation, airport NPIAS category, and state equivalent service role.
- **Runway Data Table** – This table portrays information relating specifically to the two runways at the Airport. Various specifications are listed for each existing, future, and ultimate runway, including, but not limited to, runway location, dimensions, ADG, available lighting and navigational aids, and safety areas as defined in FAA AC 150/5300-13A (Change 1), *Airport Design*.
- **Modification of Standards (MOS) Table** – This table documents the approved or pending MOS's to FAA AC 150/5300-13A Change 1, *Airport Design*, which include non-standard runway to parallel taxiway separation, runway gradient, and runway object free area.
- **Existing Taxiway Data Table** – This table provides information associated with the existing taxiways at the Airport, including, but not limited to, taxiway width, shoulder width, and taxiway safety area and object free area sizes.
- **Future Taxiway Data Table** – This table provides information associated with the future and ultimate taxiways at the Airport, including, but not limited to, taxiway width, shoulder width, and taxiway safety area and object free area sizes.
- **Declared Distances Table** – This table presents the declared distances for Runway 9-27 in their existing, future, and ultimate configuration. A graphical representation of this information is presented next to the table.
- **Wind Rose and Wind Coverage Table** – A graphical representation of the airport wind roses and wind data is depicted on this sheet. This information was obtained from the National Climatic Data Center provided by the U.S Department of Commerce. Weather data for the period of record from 2006 – 2015 (10-year annual averaged data) with 87,463 observations was used. Wind data is 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).

10.5 Existing Airport Layout Plan

The Existing Airport Layout Plan shown on Sheet 3 is provided as a reference document to identify existing facilities (including airfield pavement, buildings and other structures). The ALP sheet represents the Airport in its entirety at a scale of 1 inch = 300 feet. The ALP drawing is a graphic presentation of the actual layout of the physical facilities at EYW. Major features of the ALP drawing include runways, taxiways, aprons, NAVAIDS, other existing airport facilities, and the roadway system. This drawing also includes the 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. It also includes pertinent clearance and dimensional information associated with the runways and taxiways such as RSAs, ROFAs, and RPZs. Imaginary elements are also included on the drawing sheet including airport reference point (existing), ground terrain contours, and other dimensional data recommended by the FAA.

10.6 Future Airport Layout Plan

Sheet 4 in the ALP drawing set is the Future Airport Layout Plan. This sheet depicts the current conditions at the airport as of September 2018 as well as any proposed future development. The graphical scale of the drawing is 1 inch = 600 feet. A compass with the angle of declination (magnetic north), including the annual rate of change for the magnetic declination is included above the scale. This drawing presents the existing airport runway, taxiways, facilities, Off-airport facilities and roadways, safety areas, and runway approaches. Location information such as the airport reference point and key elevations for the runway are also included. Future proposed additions or changes to these areas are presented in a different block/color for easy referencing. Future facility and infrastructure improvements depicted on this sheet include the following:

- New Taxiway's and Existing Taxiway Geometry Improvements
- Commercial Apron Expansion
- Overflow Aircraft Parking Apron Construction
- Passenger Terminal Improvements and Expansion
- Taxiway A Extension to the West
- General Aviation Access Road Construction
- Vehicle Service Road Relocation
- New Perimeter Fence
- Taxiway D Relocation
- Runway 27 Bypass Taxiway and Safety Improvements
- Rental Car and Public Parking Facilities

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 as presented on the data sheet (sheet 2). This future ALP sheet serves as an overview for the Federal Aviation Administration and EYW as grants and other federal funding improvements are considered.

10.7 Ultimate Airport Layout Plan

Sheet 5, Ultimate Airport Layout Plan, presents the ultimate development vision for the Airport. Scheduling for the projects presented on this sheet is not certain and will be based on the availability of funding. However, the FAA Orlando Airports District Office (ADO) recommended that the ultimate vision for the development of the Airport, including the elimination of the modification of standard for the non-standard runway to taxiway separation distance, be presented as part of the ALP drawing set. Specifically, the Ultimate ALP reflects the relocation of Runway 9-27 85 feet north, in order to provide a 400-foot runway-to-taxiway separation. This project will be completed when funding is available, the environmental process is completed, and mitigation plans are available to minimize impacts during and after construction. This drawing also illustrates the expansion of the terminal expansion to the east.

10.8 14 CFR Part 77 Surfaces

Sheet 6 of the ALP drawing set provides the 14 CFR Part 77 Airport Airspace Plan, sheet 7 provides the Airport Airspace Plan and sheet 8 provides the 14 CFR Part 77 data tables. 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, which include existing obstructions that penetrate the 14 CFR Part 77 imaginary surfaces. Local zoning ordinances are established for 14 CFR Part 77 protective airspace surfaces. Refer to Key West, Florida Code of Ordinances Section 122-1438 for Airport zones and Airport height limitations.

14 CFR Part 77 surfaces correspond to available navigational aids and types of approaches available to a runway end. **Table 10.7-1** summarizes the 14 CFR Part 77 dimensions associated with both ends Runway 9 and 27 at the Airport. The specific Part 77 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 surface for EYW is 500 feet wide.
- **Approach Surfaces** – The approach 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 and the outer edge is 3,500 feet wide. The approach surfaces for EYW have a length from the inner to outer edge of 10,000 feet.
- **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** – The horizontal surface is a plane located 150 feet above the established Airport elevation with an overall radius of 10,000 feet from the runway centerline. 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 edge of the horizontal surface at a slope of 20:1, for a horizontal distance of 4,000 feet.

Table 10.7-1: EYW - 14 CFR Part 77 Imaginary Surfaces by Runway End

	RUNWAY 9 (EXISTING)	RUNWAY 9 (FUTURE/ULTIMATE)	RUNWAY 27 (EXISTING)	RUNWAY 27 (FUTURE/ULTIMATE)
Approach Type	Non-Precision	Same	Non-Precision	Same
Primary Surface Width (feet)	500	Same	500	Same
Horizontal Surface Radius (feet)	10,000	Same	10,000	Same
Approach Surface Width (inner) (feet)	500	Same	500	Same
Approach Surface Width (outer) (feet)	3,500	Same	3,500	Same
Approach Surface Length (feet)	10,000	Same	10,000	Same
Approach Slope	34:1	Same	34:1	Same

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., September 2018.

The airspace drawing sheets also identified any obstructions to the Part 77 surfaces. Currently, 496 obstructions have been identified for EYW. Of these 496 obstructions, 226 penetrate the primary surface, 252 penetrate the transitional surface, 10 penetrate the horizontal surface, and 8 penetrate the conical surface. No obstructions were identified in the approach. Of the 496 obstructions identified, 467 obstructions were classified as tree tops which will be trimmed or removed, and 29 obstructions were classified as manmade structures which will be marked/lighted.

10.9 Inner Portion of the Approach Surface Drawings

Runway Inner Approach Surfaces for Runway 9 (Sheet 9) and Runway 27 (Sheet 10) of the ALP provide zoomed in scaled drawing of areas immediately beyond the existing runway ends including the RPZ's. Areas within the runway RPZ's are to be cleared of obstacles that could be a hazard to aircraft operating at the airport according to FAA recommendations. The runway inner approach surface sheets identify objects that penetrate existing and/or proposed approach surfaces. These obstructions could be roadways, manmade structures, natural ground elevations, or natural features. Located in the inner portions of the runway approach surfaces for EYW, 46 obstructions were identified for Runway 9 and 110 obstructions were identified for Runway 27. These

obstructions include treetops which will be trimmed or removed, and manmade structures like utility poles and building objects which will be marked/lighted.

10.10 Terminal Area Plan

Sheet 11 provides the Future Terminal Area Layout, which shows the terminal core and the general aviation expansion area with a scale of 1" = 200'. This sheet provides more detail for future facilities planned at the Airport along with the existing gate and apron parking layout.

10.11 Airport Land Use Plan

The Airport Land Use Plan presented on Sheet 12 of the ALP drawing set illustrates the proposed use of property within the current, expanded boundary of the Airport, or adjacent areas. This sheet identifies various land use areas using various hatch colors. Noise contours are also included representing the 65, 70, and 75 DNL noise levels to show the land uses present in these noise contours. Areas in which the airport has aviation easements are also illustrated. These land use categories include:

- **Airport Operations Area** – Includes the land area reserved for activities supporting and sustaining the safe and efficient operation of aircraft such as runways and taxiways, and property within the limits of the RPZ, runway object free areas, and taxiway object free areas.
- **Aviation** – Includes areas reserved for aviation activity and/or to support aviation activity including hangar's, parking aprons, terminals, and vehicle parking facilities.
- **Non-Aviation** - Area's identified and reserved for non-aviation purposes but who do not include commercial uses.
- **Environmental** – Area's identified as environmental wetlands by the US Fish and Wildlife Service.
- **Community/Government** – Includes area's reserved for places of gathering which including public parks and schools.
- **Vacant** – Area's currently vacant with no designated land use.
- **Residential** – Area's identified for private residencies.
- **Transient Residential** – Area's identified for transient user accommodation including hotels and seasonal residencies.
- **Commercial** – Landside areas identified for income-generating uses including restaurants.

10.12 Airport Property Map

The Airport Property Map on Sheet 13 provides an overview of all land conveyances associated with the airport (available from public records) and how they were acquired in chronological order. Properties that were released and aviation easements obtained are also illustrated on the airport property map. These land conveyances aid in creating the approximate airport property boundary used in the ALP drawing sheets. A table identifies and summarizes the various parcels owned, released, or aviation easement rights obtained by the airport since inception.