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## CHAPTER NINE

# *Airport Layout Plan Package*

The Airport Layout Plan (ALP) package is a series of drawings that reflect existing conditions as well as the preferred future development for a given airport. Using plan and profile views of the facility, the ALP provides a graphic portrayal of the written content found in an airport master plan.

The ALP package of drawings for RIC was created in accordance with the criteria set forth in the FAA Advisory Circulars (ACs) 150/5300-13 *Airport Design* and 150/5300-18 *General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards*. The content of individual sheets was determined using the guidelines found in AC 150/5070-6b *Airport Master Plans Appendix F Airport Layout Plan Drawing Set* and requirements contained in the FAA Eastern Region's ALP checklist.

The Future Airport Layout Drawing (ALD) of the package is ultimately reviewed and approved by the FAA from a regulatory and safety perspective. Once approved, the Future ALD serves as the initial step in securing access to federal funding through the FAA for existing and future airport studies and construction projects.

The ALP package for RIC consists of the drawings listed below and can be found as **Appendix I**. The sections following the list of drawings describe each individual sheet in more detail:

- Cover Sheet
- Data Sheet
- Existing Airport Layout Drawing
- Future Airport Layout Drawing
- Airport Airspace Drawing East
- Airport Airspace Drawing West
- Outer Approach Plans A
- Outer Approach Plans B
- Runway 2 Inner Portion of Approach Surface
- Runway 20 Inner Portion of Approach Surface
- Runway 2 Departure Surface
- Runway 20 Departure Surface
- Runway 7-25 Inner Portion of Approach Surface
- Runway 7-25 Departure Surface
- Runway 16 Inner Portion of Approach Surface
- Runway 34 Inner Portion of Approach Surface
- Runway 16 Departure Surface
- Runway 34 Departure Surface
- Runway 16R-34L Inner Portion of Approach Surface
- Runway 16R-34L Departure Surface
- Terminal Area Plan
- Land Use Drawing
- Airport Property Map

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## 9.1 COVER SHEET

The cover sheet contains approval blocks, airport location maps and other pertinent information as required by local FAA District Offices and State aviation agencies.

## 9.2 DATA SHEET

The data sheet contains basic airport and runway data tables and includes:

- Wind Rose Information – Wind roses and corresponding wind data are provided for all weather conditions, Visual Flight Rules (VFR) conditions, and Instrument Flight Rules (IFR) conditions for each runway.
- Runway Protection Zone (RPZ) Data – The FAA defines this zone as an area off the runway end to enhance the protection of people and property on the ground. The data table outlines RPZ dimensions for existing and future runways.
- Airport Data Table – Geographical, operational, meteorological, and classification data are shown in this table for both existing and future airfield layouts.
- Runway Data Table – Physical, geometrical, and operational data for each runway are listed in this table. Data includes runway dimensions, runway classifications, wind coverage for each runway, maximum runway elevation, pavement types and loading strengths, runway gradients, approach and obstruction clearance slopes, runway approach categories, runway safety area dimensions, runway lighting and marking data, navigational aids data, approach visibility minima, and declared distances information.
- Runway End Data – Provides a detailed listing of existing and future runway end coordinates and runway touchdown zone elevations (TDZ). The runway TDZ is defined as the highest point within the first 3,000 feet of a given runway end.
- Other Data – Notes that apply to the entire ALP package (e.g., North Arrow or other pertinent data such as FAA Airspace Approval Cases).

## 9.3 EXISTING AIRPORT LAYOUT DRAWING

The existing airport layout drawing (ALD) provides a general layout of the environment in and surrounding a given airport. It depicts existing facilities as well as nearby surroundings and is shown with a scale 1:600 feet. This drawing shows required facility identifications, labels, imaginary surfaces, RPZs, and Runway Safety Areas (RSAs).

Elements of the existing ALD include airfield infrastructure such as runways, taxiways, aprons, and holding areas. The existing ALD also includes passenger terminals, concourses, and depicted access to these facilities. Existing General Aviation areas are

also depicted on the ALD. Other aviation-related items such as navigational aids are shown.

Other features shown in the existing ALD are the airfield navigational aids, main cargo areas and cargo buildings, existing military sites, and maintenance facilities, and other support infrastructure such as buildings, roads, railroads, and fencing. The existing airport property line is depicted on the ALD. The importance of the airport property line is to separate aviation and non-aviation facilities that are on or off airport property.

## 9.4 FUTURE AIRPORT LAYOUT DRAWING

The Future ALD shows the proposed airport configuration and recommended facilities designed to develop the Airport. It graphically depicts all of the elements of the existing ALD and also includes proposed future development.

The future ALD depicts infrastructure such as future airfield pavement, clearances over future facilities, future safety surfaces, critical areas, and future dimensions. Other items shown on the future ALD include future terminal development, future support facilities, future building identification, and relocation information. Finally, future access facilities, easements, and the future property line work are found on this drawing.

## 9.5 AIRPORT AIRSPACE DRAWINGS

The airport airspace drawings provide a depiction of the relationship between objects and navigable airspace. These drawings are developed for each runway on the airport, and they are separated into four separate elements – the Airport Airspace Drawing, the Outer Approach Plans, the Inner Approach Plans, and the Departure Surface Plans. Each element focuses on a different part of navigable airspace with the intent of capturing and assessing all pertinent airspace surrounding an airport runway configuration to help evaluate and ultimately enhance safety from an airspace utilization standpoint.

An aerial photo was taken in August 2007 to gain aerial insight into the natural and non-natural surroundings in and around the immediate vicinity of the airport. This aerial photo serves as a background source of information for the Inner Approach Sheets. As part of this mapping effort, digital photogrammetric surveying was completed to document the topography within and in the immediate vicinity of the airport property boundary. Additionally, an obstruction survey was produced from this mapping effort.

The electronic data was analyzed from a navigable airspace regulatory perspective, namely the FAA's 14 CFR Part 77 *Objects Affecting Navigable Airspace*. Any object that constituted a penetration to a navigable airspace surface was listed and described in one of the airspace drawings with an ultimate plan of action for the object. For clarity, only object data that came within 10 feet of an airspace surface was depicted and described on the Airport Airspace Drawings.

### **9.5.1 Airport Airspace Drawing**

This drawing depicts obstacle identification surfaces for the full extent of all airport development. It shows airspace obstructions that are not shown in the Outer Approach Plans, Inner Approach Plans or Departure Surface Plans. The Airport Airspace Drawing is shown at a 1:2000 foot scale in plan view and depicts, through line work, imaginary FAA Part 77 surfaces – Primary, Approach, Transition, Horizontal, and Conical Surfaces. These drawn surfaces are based on future (new) runways as well as planned extensions to existing runways, while excluding runways that will be decommissioned.

For airports with precision approaches requiring a 50,000 foot long approach, it is common to have multiple sheets to ensure a comprehensive view of the entire approach. A United States Geological Survey Quadratic Map is contrasted against the surfaces in this drawing to give the reader a topographical and geographical contrasting perspective against the imaginary surfaces.

### **9.5.2 Inner Approach Plans**

These drawings contain the plan and profile views of the inner portion of the approach surface to the runway along with a tabular listing of pertinent objects (e.g., penetrations). The drawing also depicts the threshold siting surface (TSS).

The extent of the approach surface and the number of airspace obstructions shown have, in some cases, restricted sheets to only one runway end or approach. Typically, the Inner Approach is limited to the RPZ area. Another FAA guideline is to show the distance of a given slope until it reaches 100 feet above the threshold elevation. Depending on the approach slope applied, (e.g., 20 feet:1, 34 feet:1, 50 feet:1 etc.), this application leads to a plan and profile distance ranging typically from about 2,000 feet to 5,000 feet from the runway threshold. Although not required, any objects outside of the approach slope that are within the adjacent 7 foot:1 foot transitional slope stemming from the approach slope have been identified.

For the profile views, a 1:200 foot horizontal scale and a 1:20 foot vertical scale is common. Inner Approach Plans also depict the ground contours on centerline plus any significant natural or non-natural objects on its extended centerline and provide a top elevation for these objects. Commonly shown objects include buildings, roads, railroads, ditches, and natural features such as mountains, trees, lakes, and rivers.

### **9.5.3 Outer Approach Plans**

Generally speaking, outer approach plans are profile views of approaches to runway ends that cover areas beyond the inner approach plans and terminate at the outermost distance of the approach. This outermost distance may range anywhere from 5,000 feet to 10,000 feet and ultimately up to 50,000 feet when considering a precision approach.

Similar to Inner Approach Plans, the approach surface is shown to lead all the way to the runway threshold or to a 200 foot offset from the runway threshold in a profile view. A

tabular listing of pertinent objects and penetrations is presented. Objects that are near the approach slope but do not penetrate may also be listed. There is no plan view available for Outer Approach Plans.

Outer Approach Plans also depict the ground contour along the extended runway centerline plus any significant natural or non-natural objects located along the extended centerline and provide a top elevation for these objects. Commonly shown objects include buildings, roads, railroads, ditches, and natural features such as mountains, trees, lakes, and rivers.

#### **9.5.4 Departure Surface Plans**

These drawings contain the plan and profile views of the 40 feet:1 departure surface portion of the runway along with a tabular listing of all pertinent objects/penetrations. The extent of the departure surface and the number of airspace obstructions shown have in some cases restricted sheets to only one runway end or approach.

For the profile views, a 1:200 foot horizontal scale and a 1:20 foot vertical scale is common. Departure Surface Plans also depict the ground contour along the extended runway centerline plus any significant natural or non-natural objects located along the extended runway centerline and provide a top elevation for these objects. Commonly shown objects include buildings, roads, railroads, ditches, and natural features such as mountains, trees, lakes, and rivers.

### **9.6 TERMINAL AREA PLAN**

This plan is represented by a large-scale depiction of areas with significant terminal facility development. This drawing is an enlarged area of the passenger terminal area portion of the future ALD. The scale for this drawing is 1:50 feet. A keyed legend identifies the prominent development in the terminal area and known building heights.

### **9.7 LAND USE PLANS**

The Land Use Drawing depicts land uses within the property boundary and land uses and zoning in the area around an airport. The drawing also depicts the Noise Contours developed for the Master Plan.

### **9.8 AIRPORT PROPERTY MAP**

Per FAA definition, this drawing depicts the airport property boundary, tracts of land acquired by the airport, and the method of acquisition.

### **9.9 PREFERRED DEVELOPMENT PLAN**

The culmination of the Airport Master Planning process is the Preferred Development Plan of the most favorable development option. The projects shown on the Preferred Development Plan are depicted on the Future Airport Layout Drawing as stated in Section 9.4. The Preferred Development Plan includes improvements to the runway and taxiway

system, expansion of other airside facilities, and preservation of the existing infrastructure. Proposed improvements to the airport's terminal area will enhance its efficiency and ability to handle the forecasted enplanements. Additionally, the proposed improvements will allow the airport's terminal area to meet future demand requirements. Preferred support/ancillary facilities will assist with the operational efficiency of the airport with relocating various facilities or expanding existing facilities due to the addition of Runway 16R-34L. Proposed improvements in terms of roadways, vehicle parking areas, and rental car facilities will enhance airport accessibility and will increase passenger level of service at the airport. In an effort to provide for future expansion of the non-aviation revenue, the airport has reserved space for future commercial development in an Airport Business Park. It is prudent to plan for additional compatible revenue sources on property that cannot be used for airport operations. Accordingly, the area along the north and south portions of South Airport Drive has been reserved for this type of activity.