8 Airport Role Analysis and Benchmarks

Introduction

This chapter addresses the structure and purpose of an airport role analysis and the methodology used to allocate airports to their respective roles.

There are three key reasons behind grouping airports by role. The first is that it provides a broad overview of the airport system by showing how many airports fall into each role. The second is that it is a useful means of analyzing airport system performance. In addition to measuring the performance of the overall system, the performance of different segments of the system can be measured based upon how the system is subdivided. Thirdly, recommended facility standards can be developed for each airport role. These recommended facility standards are based upon the objectives developed in Chapter 2.

Before laying out the process of assigning Kentucky's system airports to their respective roles, it is useful to examine how these airports are classified in various other system plans. There are two national system classifications that this chapter will examine to provide context. Those two classification systems are the FAA National Plan of Integrated Airport Systems (NPIAS) and the FAA Asset Study. Each one is detailed below in terms of how it stratifies airports into classes, the purpose behind that stratification, and how Kentucky's system fits into those two methodologies.

National Plan of Integrated Airport Systems

The NPIAS is the FAA's nationwide airport system plan. It is updated and sent to Congress every two years with the intent of identifying airports that are significant to the national air transportation system. In order to be included in the NPIAS, airports must meet a number of criteria, but, in general, an airport must:

- Be open to public use;
- Have at least 10 based aircraft;
- Be at least 20 miles from the nearest NPIAS airport; and
- Be part of a state airport system plan.

For airports to receive federal Airport Improvement Program (AIP) funding, they must be included in the NPIAS.

Kentucky's system of airports consists of 59 public-use airports, of which 55 are part of the NPIAS. The NPIAS classifies airports using two systems, one aimed at airports with commercial airline service and the other aimed at general aviation airports. The first is referred to as the NPIAS classification in this report, while the second is called the Asset classification.

The NPIAS classification begins with sorting airports into one of two groups – primary airports (those airports with scheduled commercial air service that enplane 10,000 or more passengers annually) and nonprimary airports. The primary airports are further broken down on the basis of their proportion of national enplanements.

- **Large Hub** – a primary airport that enplanes 1 percent of more of total U.S. passenger enplanements.
- **Medium Hub** – a primary airport that enplanes between 0.25 percent and 1 percent of total U.S. passenger enplanements.

- **Small Hub** – a primary airport that enplanes between 0.05 percent and 0.25 percent of total U.S. passenger enplanements.
- **Nonhub** – a primary airport that enplanes less than 0.05 percent of total U.S. passenger enplanements.

The nonprimary airports are categorized into three groups.

- **Commercial Service** – a nonprimary airport that enplanes 2,500 or more passengers annually.
- **Reliever** – a nonprimary airport with 100 or more based aircraft or 25,000 itinerant operations annually. The FAA recognizes these airports to encourage development of high-capacity general aviation airports in major metropolitan areas in an effort to alleviate congestion at commercial service airports in the region.
- **General Aviation** – a nonprimary airport that does not fall into the Commercial Service or Reliever category.

Table 8-1 summarizes the number of Kentucky system airports that fall into each NPIAS classification. It is apparent that, while the NPIAS classifications provide distinction between commercial airports, there is little difference amongst the general aviation airports, with a single airport in Kentucky classified as a reliever, while the other 49 are labeled general aviation.

Table 8-1
Kentucky Airport NPIAS Classifications

NPIAS Classifications	Number of Airports
Primary Airports	
Large Hub	0
Medium Hub	1
Small Hub	2
Nonhub	2
Nonprimary Airports	
Commercial Service	0
Reliever	1
General Aviation	49
Not in NPIAS	4
Total	**59**

Note: Bowling Green-Warren County Regional Airport did not have commercial airline service at the time that the NPIAS was last published, so the NPIAS classified this airport as a General Aviation Airport.
Source: *National Plan of Integrated Airport Systems 2017-2021*

The purpose of the NPIAS classification is primarily to aid the FAA in funding airport capital programs and its method of categorization works well for that purpose. However, with only two categories for general aviation airports, it is obvious that the NPIAS does not offer much differentiation in terms of general aviation airport classifications.

FAA Asset Study

The FAA addressed this lack of differentiation among general aviation airports with its Asset Study. This study examined general aviation airports across the U.S. and was released in 2012. The Asset Study classified 2,455 out of the 2,952 NPIAS general aviation airports. In 2014, the FAA revisited many of the general aviation airports that it did not originally classify. The efforts of the 2012 study were incorporated into the 2013 NPIAS report. The 2015 NPIAS report included the results of both

the 2012 and 2014 Asset studies. The FAA plans to review and update Asset roles in future NPIAS reports. Those Asset roles are defined as follows:

- **National Airports** – These airports have very high levels of activity with many jets and multi-engine propeller aircraft. They average about 200 total based aircraft, of which 30, on average, are jets.
- **Regional Airports** – These airports have high levels of activity with some jets and multi-engine propeller aircraft. They average 90 total based aircraft, of which three, on average, are jets.
- **Local Airports** – These airports have moderate levels of activity with some multi-engine propeller aircraft. They average 33 based propeller-driven aircraft and no jets.
- **Basic Airports** – These airports have moderate to low levels of activity, but often serve critical aeronautical functions within local and regional markets. They average about 10 propeller-driven based aircraft.
- **Unclassified** – The 2017 NPIAS report left 256 airports unclassified.

Kentucky's 55 NPIAS airports are classified into four of the Asset categories described previously. None of Kentucky's airports met the criteria to be classified as a National Airport. As shown in **Table 8-2**, the FAA identified seven Regional Airports, 25 Local Airports, and 13 Basic Airports.

Table 8-2
Kentucky Asset Study Airport Classifications

Asset Classifications	Number of Airports
Commercial Service	5
National	0
Regional	7
Local	25
Basic	13
Unclassified	5
Not in NPIAS	4
Total	**59**

Note: Bowling Green-Warren County Regional Airport did not have commercial airline service at the time that the NPIAS was last updated, so the airport was classified as a Regional Airport.
Source: FAA *National Plan of Integrated Airport Systems 2017-2021*

Table 8-3 lists the NPIAS and Asset classifications for each Kentucky system airport.

While the Asset classifications provided greater differentiation for general aviation airports than the NPIAS classifications, they still have limitations. The FAA could not establish Asset classifications for five of Kentucky's NPIAS airports. Additionally, four of Kentucky's system airports are not part of the NPIAS, resulting in nine out of the 59 system airports, or about 15 percent, that are left without an Asset classification. Additionally, while a national study like the Asset Study is useful for comparative purposes, due to its broad scope, it cannot take into account as many airport details as can be done at the state level. A state system plan can assign airport roles to all system airports using a methodology best suited for the goals of the state.

Table 8-3
NPIAS and Asset Study Airport Classifications for Kentucky's System Airports

City	Airport	NPIAS Role	Asset Role
Covington	Cincinnati/N. Kentucky International	Medium Hub	Commercial Service
Owensboro	Owensboro-Daviess County Regional	Nonhub	Commercial Service
Paducah	Barkley Regional	Nonhub	Commercial Service
Lexington	Blue Grass	Small Hub	Commercial Service
Louisville	Louisville International-Standiford Field	Small Hub	Commercial Service
Louisville	Bowman Field	Reliever	Regional
Ashland	Ashland Regional	General Aviation	Local
Bardstown	Samuels Field	General Aviation	Local
Bowling Green	Bowling Green-Warren County Regional*	General Aviation	Regional
Cadiz	Lake Barkley State Resort Park	General Aviation	Unclassified
Campbellsville	Taylor County	General Aviation	Basic
Cynthiana	Cynthiana-Harrison County	General Aviation	Local
Danville	Stuart Powell Field	General Aviation	Regional
Elizabethtown	Addington Field	General Aviation	Local
Falls of Rough	Rough River State Resort Park	General Aviation	Unclassified
Falmouth	Gene Snyder	General Aviation	Local
Flemingsburg	Fleming-Mason	General Aviation	Local
Frankfort	Capital City	General Aviation	Regional
Fulton	Fulton	General Aviation	Basic
Georgetown	Georgetown Scott County - Marshall Field	General Aviation	Local
Gilbertsville	Kentucky Dam Village State Resort Park	General Aviation	Unclassified
Glasgow	Glasgow Municipal	General Aviation	Local
Greenville	Muhlenberg County	General Aviation	Local
Hardinsburg	Breckinridge County	General Aviation	Basic
Harlan	Tucker-Guthrie Memorial	General Aviation	Basic
Hartford	Ohio County	General Aviation	Basic
Hazard	Wendell H. Ford Regional	General Aviation	Local
Henderson	Henderson City-County	General Aviation	Regional
Hopkinsville	Hopkinsville-Christian County	General Aviation	Local
Jackson	Julian Carroll	General Aviation	Unclassified
Jamestown	Russell County	General Aviation	Basic
Leitchfield	Grayson County	General Aviation	Basic
Lewisport	Hancock Co-Ron Lewis Field	General Aviation	Local
London	London-Corbin-Magee Field	General Aviation	Regional
Madisonville	Madisonville Regional	General Aviation	Local
Marion	Marion-Crittenden County	General Aviation	Local
Mayfield	Mayfield Graves County	General Aviation	Local
Middlesboro	Middlesboro-Bell County	General Aviation	Local
Monticello	Wayne County	General Aviation	Basic
Morehead	Morehead-Rowan County Clyde A. Thomas Regional	General Aviation	Local
Mount Sterling	Mount Sterling-Montgomery County	General Aviation	Regional
Murray	Kyle-Oakley Field	General Aviation	Local
Pikeville	Pikeville – Pike County Regional	General Aviation	Local
Pine Knot	McCreary County	General Aviation	Unclassified
Prestonsburg	Big Sandy Regional	General Aviation	Local
Princeton	Princeton-Caldwell County	General Aviation	Basic

Table 8-3
NPIAS and Asset Study Airport Classifications for Kentucky's System Airports

City	Airport	NPIAS Role	Asset Role
Richmond	Central Kentucky Regional	General Aviation	Local
Russellville	Russellville-Logan County	General Aviation	Basic
Somerset	Lake Cumberland Regional	General Aviation	Local
Springfield	Lebanon-Springfield	General Aviation	Local
Stanton	Stanton-Powell County	General Aviation	Basic
Sturgis	Sturgis Municipal	General Aviation	Basic
Tompkinsville	Tompkinsville-Monroe County	General Aviation	Local
West Liberty	West Liberty	General Aviation	Local
Williamsburg	Williamsburg-Whitley County	General Aviation	Basic
Columbia	Columbia-Adair County	Not in NPIAS	Not in NPIAS
Dawson Springs	Tradewater	Not in NPIAS	Not in NPIAS
Liberty	Liberty-Casey County	Not in NPIAS	Not in NPIAS
Providence	Providence-Webster County	Not in NPIAS	Not in NPIAS

* Bowling Green-Warren County Regional did not have commercial airline service at the time that the NPIAS was last updated, so the airport was classified as a General Aviation Airport in the NPIAS and a Regional Airport in the Asset Study.
Classifications current as of March 2017.
Source: FAA *National Plan of Integrated Airport Systems 2017-2021*.

Kentucky Airport Roles

The process of developing airport roles for the Kentucky airport system was a collaborative process involving KYTC and its consultants. KYTC elected to define one commercial service airport role and four general aviation airport roles for its system plan. These roles were assigned through a flow chart that logically and systematically determines an airport's role. The flow chart begins by identifying Commercial Service Airports as those served by scheduled commercial airlines. Then, general aviation airports are analyzed in more detail, using a set of four factors selected by KYTC to objectively analyze each airport. The four factors used to categorize each general aviation airport are:

- Type of fuel sold
- Runway length
- Ceiling minimums for the airport's best instrument approach procedure
- The relative number of jet departures

Each of these factors is described below in more detail.

Type of fuel sold

The general aviation fleet of aircraft typically rely on either jet fuel (for turbine powered aircraft), or avgas (for piston powered aircraft). There are other fuel options available to some general aviation aircraft, such as mogas, but jet fuel and avgas account for more than 99 percent of the fuel consumed by general aviation. Airports where jet fuel is available have a greater potential for attracting business jets, and airports with avgas are more appealing to owners of piston aircraft as compared to airports without fuel. This factor assessed whether an airport provided jet fuel, avgas, or no fuel. In Kentucky, every airport that had jet fuel available also had avgas available.

Runway length

The length of an airport's primary runway is a good indicator of economic potential since longer runway lengths allow more types of aircraft to operate at the airport, as well as providing greater

operational capability since shorter runways may limit the payloads that some aircraft can carry and still operate safely within the available runway distance. This factor assessed whether an airport's primary runway was greater than or equal to 4,500 feet, between 3,200 feet and 4,500 feet, or less than 3,200 feet. The limit of 4,500 feet was selected because this is between 4,200 feet, which is the minimum runway length required by *AC 150/5300-13A Airport Design* to support an instrument approach with a cloud ceiling minimum of 250 feet or less, and 5,000 feet, which is a common standard for many jet aircraft operations. The limit of 3,200 feet was selected because this is the minimum runway length generally required by *AC 150/5300-13A Airport Design* to support a non-precision instrument approach.

Ceiling minimum for the airport's best instrument approach procedure

The ability of an airport to provide economic benefits to a region can be diminished when poor weather conditions render the airport unusable. Instrument approach procedures can offset the detrimental effects of poor weather. The more capable an instrument approach is – measured by how low it can guide an aircraft and how limited the visibility under which it can be used – the more it can contribute to the effectiveness of an airport as an economic engine. Using this rationale, the cloud ceiling minimum of each airport's best instrument approach was used to assess each airport. Ceiling was used instead of visibility because there was more variance in cloud ceilings, which permitted greater differentiation among airports. Airports were evaluated as having instrument approach cloud ceilings of 250 feet or less (this includes the most capable instrument landing systems and GPS approaches found in Kentucky), between 250 feet and 300 feet, and greater than 300 feet.

Relative number of tracked jet departures

Given the propensity for companies to use jet aircraft for business travel, the number of annual jet operations at an airport can be used as a reliable indicator of the economic potential of an airport. However, at airports without control towers, which account for the vast majority of general aviation airports, there is no means of tracking actual annual aircraft operations. Therefore, aircraft operations data is composed of activity estimates.

There is a subset of aircraft activity for which some records are kept. Most aircraft that file flight plans under instrument flight rules (IFR) have those flight plans recorded in a database. However, this data source is not all inclusive since these flight plans can be cancelled in the air and aircraft operators may opt out of being tracked for privacy or security reasons. Nevertheless, it is reasonable to use the departures recorded as a proxy of overall jet operations through comparison of identified jet departures between airports. A three-month sample of jet departures (from April 1, 2016 to June 30, 2016) for each of the system airports found that the number of tracked IFR jet departures at Kentucky system airports ranged from zero to more than 15,000. Not surprisingly, most of these departures took place at Kentucky's six commercial service airports. Examining only the general aviation airports, jet departures ranged from zero to 143 during the sampling period, with an average of 20.9 jet departures when analyzing only those general aviation airports that had at least one jet departure.

With jet departures identified through this data source, airports were assessed as having jet departures that were either above or less than the average number of jet departures, using the 20.9 value referenced previously. This factor was primarily tailored to provide differentiation among the large number of Kentucky airports that provide jet fuel.

Role Analysis

The previously described four factors were used in a flow chart methodology that assigned airport roles based on the criteria airports reported for each factor. **Figures 8-1**, **8-2**, and **8-3** show the

flow chart and its use. Starting with Figure 8-1, the flow chart shows that the six airports with airline service are assigned Commercial Service Airport roles. By categorizing the six commercial airports into a separate role, the general aviation airports could be analyzed in more detail. The general aviation airports are then evaluated based on the four factors, starting with type of fuel available, followed by runway length, then instrument approach cloud ceiling, and ending with relative number of jet operations. Figure 8-1 is for those airports that provide jet fuel, Figure 8-2 is used for airports providing avgas, and airports without any fuel make use of Figure 8-3.

The five roles were developed with an aim toward identifying the economic potential at each airport. It is worth noting that the concept of economic development potential cannot be measured directly, and must be arrived at indirectly through various measures of services or facilities. The five roles identified for the Kentucky system and their typical characteristics (not requirements) are:

Commercial Service Airports: These airports serve commercial airlines and are grouped separately from the general aviation airports in order to focus on the distinctions among the general aviation airports.

Economic Level 1 – These general aviation airports have the greatest economic potential. In general, these airports have 20 or more based aircraft, provide jet fuel, have the most effective instrument approach procedures, and offer pilot services such as automated weather reporting.

Economic Level 2 – These general aviation airports have significant economic potential. In general, these airports have 10 or more based aircraft, provide jet fuel, and have some type of instrument approach.

Economic Level 3 – These general aviation airports have developing economic potential. In general, these airports provide avgas and some offer additional services, such as automated weather reporting or an instrument approach.

Economic Level 4 – These general aviation airports have limited economic potential. Some, but not all of these airports offer avgas. Most do not have an instrument approach.

Figure 8-1
Flow Chart #1 – Airports with Jet Fuel

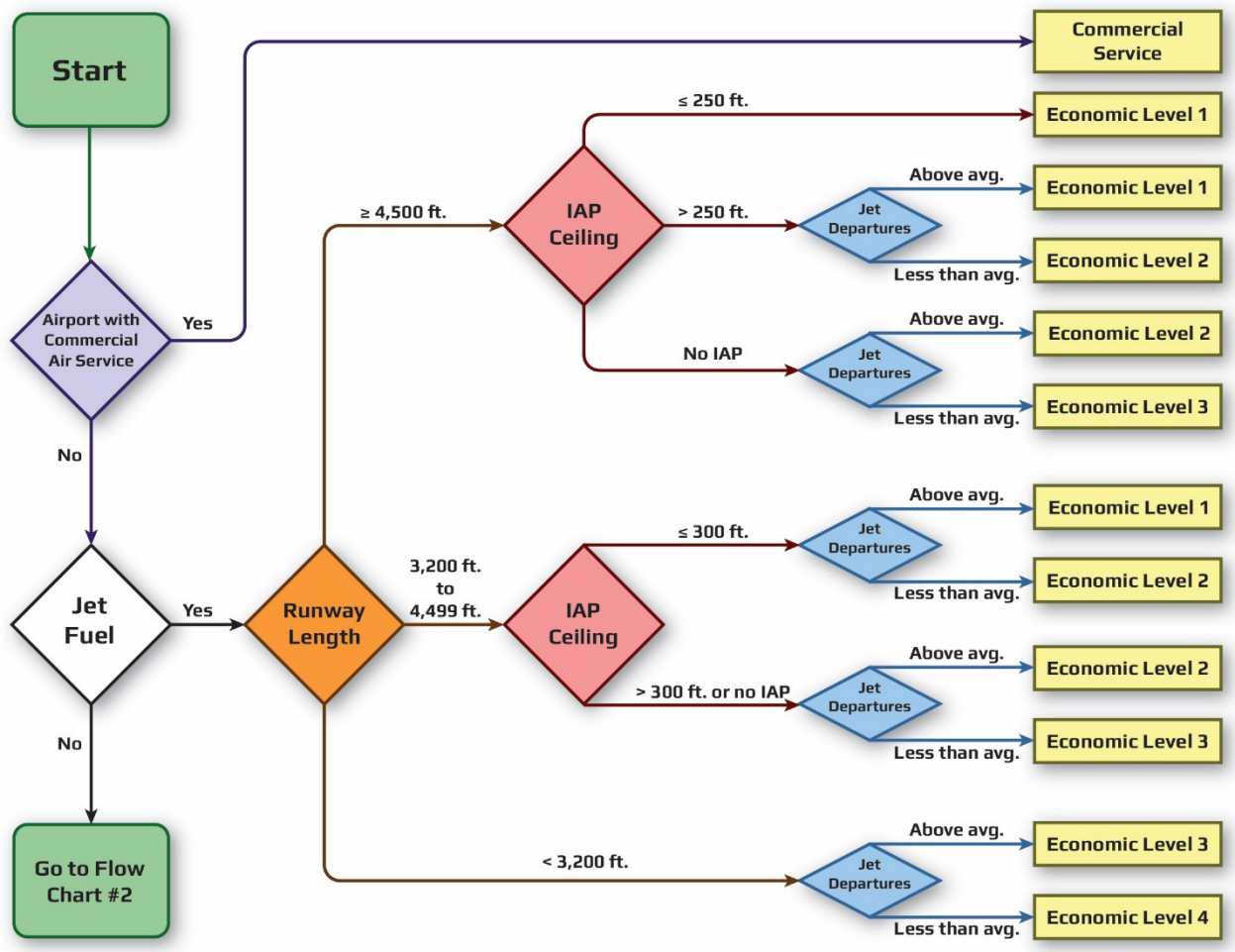


Figure 8-2
Flow Chart #2 – Airports with Avgas

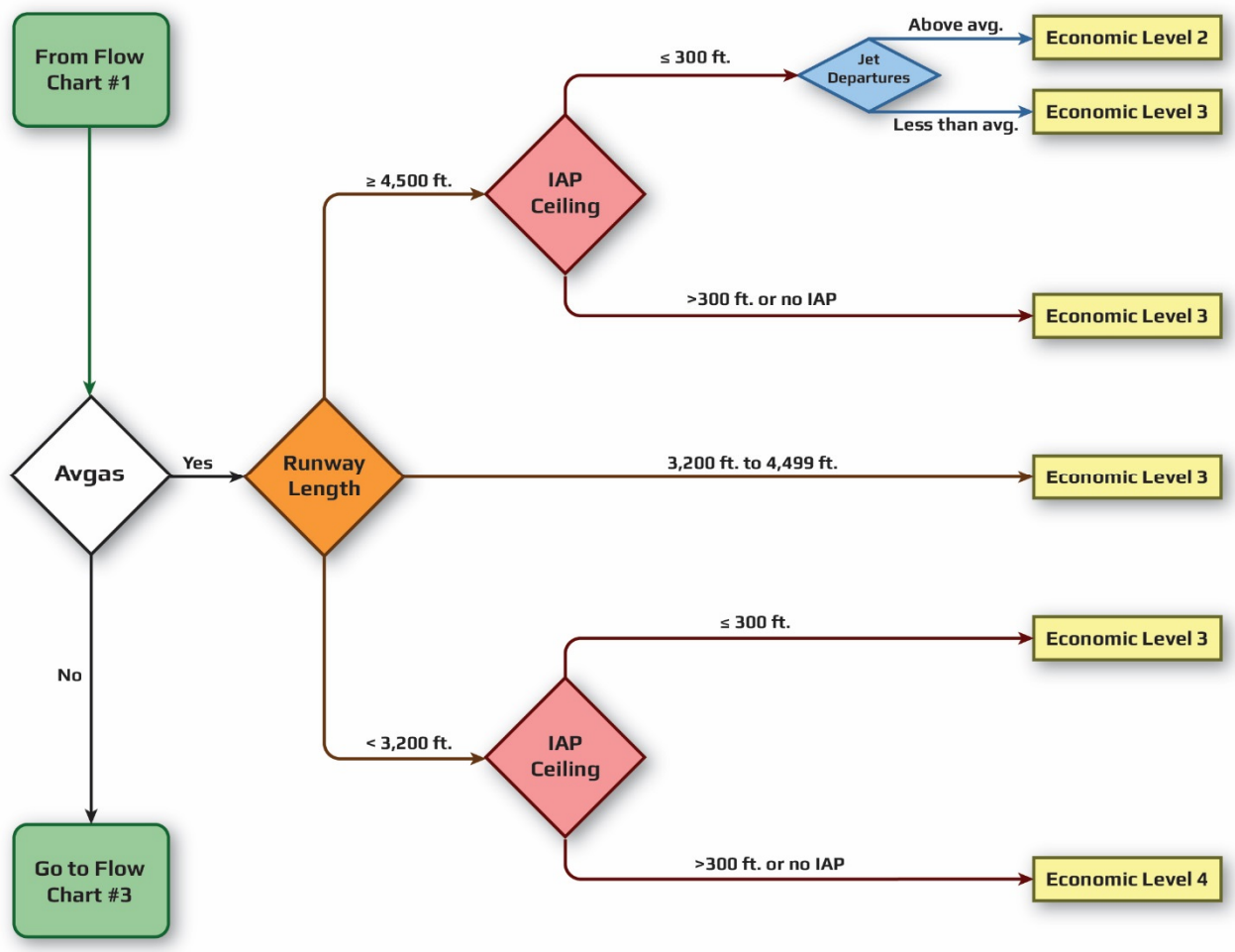
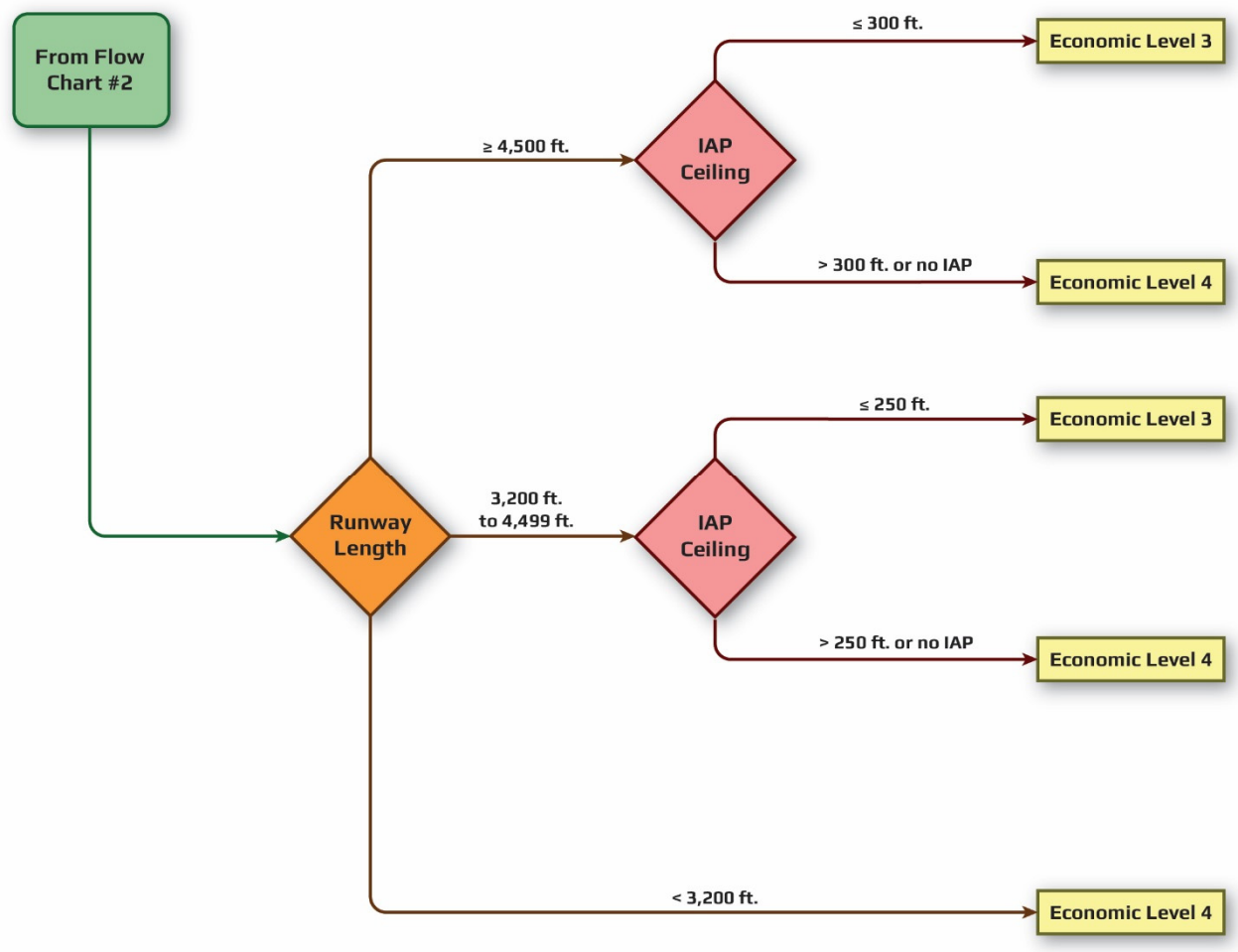


Figure 8-3
Flow Chart #3 – Airports with No Fuel



Example of Airport Role Analysis

The following example illustrates the use of the flow chart to arrive at a determination of each airport's role. It is assumed that our fictitious example "Municipal Airport" does not have commercial air service. Municipal Airport has the criteria shown in **Table 8-4**.

Table 8-4
Criteria for Municipal Airport

	Fuel Available	Runway Length	Instrument Approach Cloud Ceiling	Tracked Jet Departures
Municipal Airport	Jet Fuel	4,800 feet	No IAP	Less Than Average

Source: CDM Smith

To evaluate Municipal Airport, begin with Figure 8-1. Green boxes on the figures are entry and exit points to the flow chart. From the green Start box on Figure 8-1, move to the first decision diamond (purple) that assesses whether the airport has commercial air service. Since Municipal Airport does not have commercial air service, move to the second decision diamond (white) that assesses type of fuel available. Municipal Airport provides jet fuel, so the analysis proceeds along the "Yes" branch to the orange runway length decision diamond. If Municipal Airport only had avgas available, the analysis would proceed to Figure 8-2.

Municipal Airport's runway is greater than 4,500 feet, so the analysis moves along the "≥ 4,500 feet" branch to the red decision diamond for instrument approach procedure cloud ceiling. Since Municipal Airport does not have an instrument approach procedure, the analysis follows the "No IAP" branch to the relative number of jet operations decision diamond (blue).

For the period sampled, Municipal Airport had fewer than the average number of jet departures among those general aviation airports with at least one jet departure. Following this branch yields the airport's role designation – Economic Level 3. If Municipal Airport had any type of instrument approach, the flow chart would have resulted in Municipal Airport being categorized as an Economic Level 1 or Economic Level 2 facility, depending upon the cloud ceiling of the approach.

This flow chart methodology was applied to the Kentucky system of airports and each airport was assigned to its respective role. Using this methodology, Kentucky has six Commercial Service Airports, 24 Economic Level 1 Airports, eight Economic Level 2 Airports, 10 Economic Level 3 Airports, and 11 Economic Level 4 Airports. **Table 8-5** shows each airport and its respective role (sorted by role), including the data used to determine that role. Because the Commercial Service Airports were defined by the presence of commercial airline service and not by data used to classify general aviation airports in the flow chart, their data fields are labeled not applicable.

Later chapters will take advantage of these role designations by analyzing geographic coverage provided by different roles and assessing any regions that lack coverage by various roles and facilities. Additionally, each airport will be evaluated on how well it fulfills its role through an analysis of facility performance measures and respective benchmarks that are role based.

Table 8-5
Kentucky Airport System Role Designations

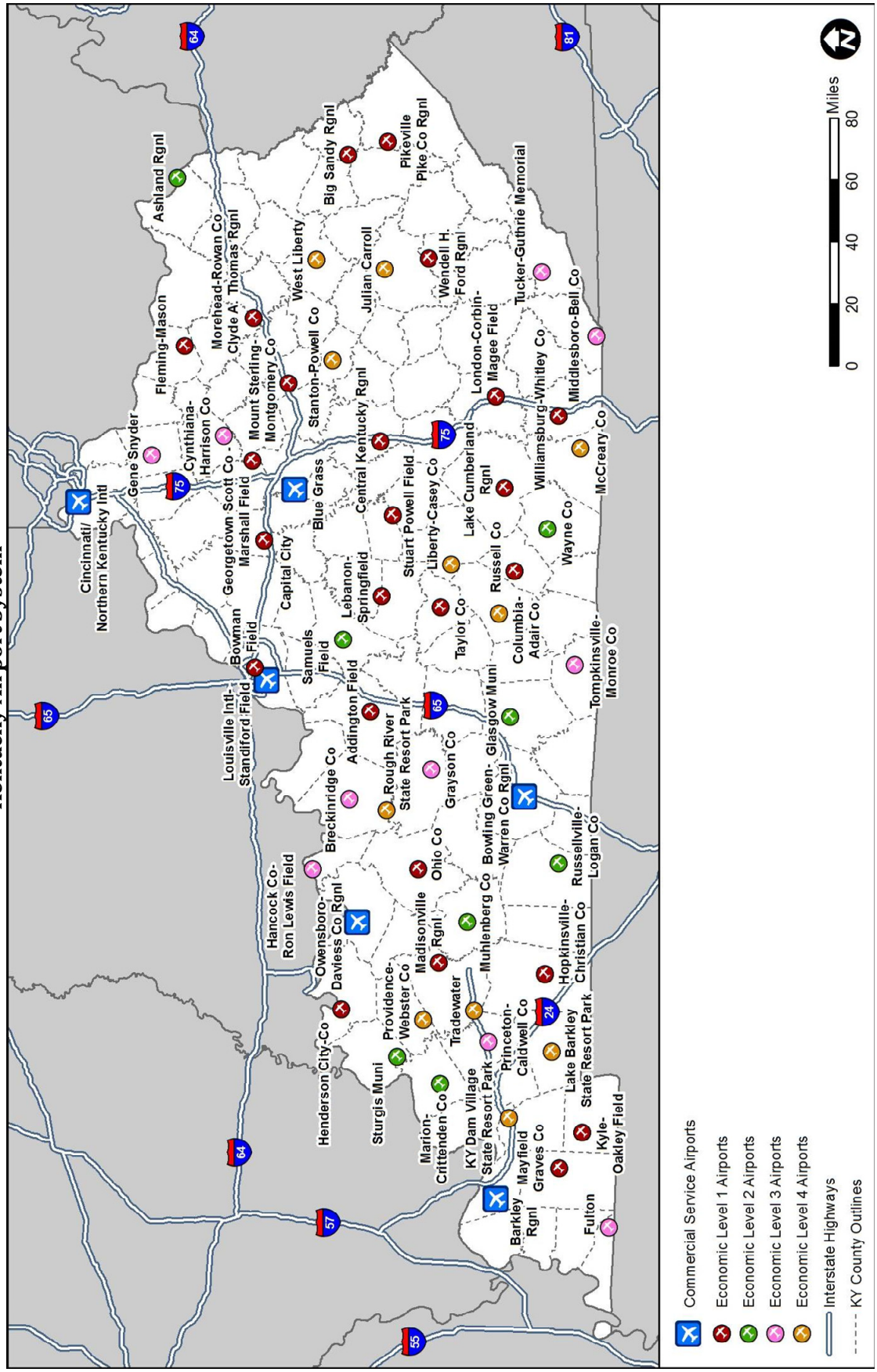
City	Airport	Fuel Available	Runway Length (feet)	Instrument Approach Cloud Ceiling (feet AGL)	Tracked Jet Departures
Commercial Service Airports					
Bowling Green	Bowling Green-Warren County Regional	Not Applicable			
Covington	Cincinnati/Northern Kentucky International				
Lexington	Blue Grass				
Louisville	Louisville International-Standiford Field				
Owensboro	Owensboro-Daviess County Regional				
Paducah	Barkley Regional				
Economic Level 1 Airports					
Campbellsville	Taylor County	Jet Fuel	5,003	250	Less Than Avg.
Danville	Stuart Powell Field	Jet Fuel	5,000	266	Above Avg.
Elizabethtown	Addington Field	Jet Fuel	6,001	369	Above Avg.
Flemingsburg	Fleming-Mason	Jet Fuel	5,001	250	Less Than Avg.
Frankfort	Capital City	Jet Fuel	5,506	275	Above Avg.
Georgetown	Georgetown Scott County - Marshall Field	Jet Fuel	5,498	200	Above Avg.
Hartford	Ohio County	Jet Fuel	5,000	250	Less Than Avg.
Hazard	Wendell H. Ford Regional	Jet Fuel	5,499	200	Less Than Avg.
Henderson	Henderson City-County	Jet Fuel	5,504	309	Above Avg.
Hopkinsville	Hopkinsville-Christian County	Jet Fuel	5,505	250	Less Than Avg.
Jamestown	Russell County	Jet Fuel	5,010	250	Less Than Avg.
London	London-Corbin-Magee Field	Jet Fuel	5,751	250	Less Than Avg.
Louisville	Bowman Field	Jet Fuel	4,326	285	Above Avg.
Madisonville	Madisonville Regional	Jet Fuel	6,050	322	Above Avg.
Mayfield	Mayfield Graves County	Jet Fuel	5,002	250	Less Than Avg.
Morehead	Morehead-Rowan County Clyde A. Thomas Regional	Jet Fuel	5,500	200	Less Than Avg.
Mount Sterling	Mount Sterling-Montgomery County	Jet Fuel	5,000	250	Less Than Avg.
Murray	Kyle-Oakley Field	Jet Fuel	6,203	250	Less Than Avg.
Pikeville	Pikeville – Pike County Regional	Jet Fuel	5,356	200	Above Avg.
Prestonsburg	Big Sandy Regional	Jet Fuel	5,000	250	Less Than Avg.
Richmond	Central Kentucky Regional	Jet Fuel	5,001	250	Less Than Avg.
Somerset	Lake Cumberland Regional	Jet Fuel	5,801	533	Above Avg.
Springfield	Lebanon-Springfield	Jet Fuel	5,001	250	Less Than Avg.
Williamsburg	Williamsburg-Whitley County	Jet Fuel	5,498	250	Less Than Avg.
Economic Level 2 Airports					
Ashland	Ashland Regional	Jet Fuel	5,602	654	Less Than Avg.
Bardstown	Samuels Field	Jet Fuel	5,003	336	Less Than Avg.
Glasgow	Glasgow Municipal	Jet Fuel	5,301	262	Less Than Avg.
Greenville	Muhlenberg County	Jet Fuel	5,000	512	Less Than Avg.
Marion	Marion-Crittenden County	Jet Fuel	4,400	250	Less Than Avg.
Monticello	Wayne County	Jet Fuel	4,000	272	Less Than Avg.
Russellville	Russellville-Logan County	Jet Fuel	4,500	319	Less Than Avg.
Sturgis	Sturgis Municipal	Jet Fuel	5,000	286	Less Than Avg.

City	Airport	Fuel Available	Runway Length (feet)	Instrument Approach Cloud Ceiling (feet AGL)	Tracked Jet Departures
Economic Level 3 Airports					
Cynthiana	Cynthiana-Harrison County	Avgas	3,850	499	Less Than Avg.
Falmouth	Gene Snyder	Avgas	3,994	441	Less Than Avg.
Fulton	Fulton	Avgas	4,001	No IAP	Less Than Avg.
Hardinsburg	Breckinridge County	Avgas	4,000	No IAP	Less Than Avg.
Harlan	Tucker-Guthrie Memorial	Jet Fuel	3,460	1,276	Less Than Avg.
Leitchfield	Grayson County	Avgas	4,000	No IAP	Less Than Avg.
Lewisport	Hancock County-Ron Lewis Field	Jet Fuel	4,000	429	Less Than Avg.
Middlesboro	Middlesboro-Bell County	Jet Fuel	3,631	1,626	Less Than Avg.
Princeton	Princeton-Caldwell County	Avgas	4,099	325	Less Than Avg.
Tompkinsville	Tompkinsville-Monroe County	Avgas	4,000	349	Less Than Avg.
Economic Level 4 Airports					
Cadiz	Lake Barkley State Resort Park	None	4,800	No IAP	Less Than Avg.
Columbia	Columbia-Adair County	Avgas	2,600	No IAP	Less Than Avg.
Dawson Springs	Tradewater	None	2,875	No IAP	Less Than Avg.
Falls of Rough	Rough River State Resort Park	None	3,200	No IAP	Less Than Avg.
Gilbertsville	Kentucky Dam Village State Resort Park	None	4,000	No IAP	Less Than Avg.
Jackson	Julian Carroll	None	4,400	493	Less Than Avg.
Liberty	Liberty-Casey County	None	3,000	No IAP	Less Than Avg.
Pine Knot	McCreary County	Avgas	2,999	409	Less Than Avg.
Providence	Providence-Webster County	None	3,800	No IAP	Less Than Avg.
Stanton	Stanton-Powell County	Avgas	2,996	No IAP	Less Than Avg.
West Liberty	West Liberty	None	2,400	No IAP	Less Than Avg.

Note: AGL – Above ground level.
No IAP – No instrument approach procedure.
All airports with jet fuel also have avgas.
Source: Airport inventory, CDM Smith

Figure 8-4 shows a map of Kentucky and its 59 system airports with each airport's role displayed on the map.

Figure 8-4
Kentucky Airport System



Source: CDM Smith.

System Performance Measures and Benchmarks

A key function of identifying airports by role is using those roles to evaluate how well the airport is fulfilling that role. This is accomplished by establishing recommended benchmarks for certain performance measures within each airport role. The relevant performance measures are those individual airport objectives (explained in Chapter 2) that airport management have the ability to influence to some degree.

These benchmarks are not requirements for each airport since some airports do not meet certain benchmarks yet still manage to satisfy the role they play in the system plan. Rather, these benchmarks serve two purposes. The first is to provide a means to measure the performance of the aviation system. By assessing how many airports within each role meet the benchmark for a particular performance measure, a percentage performance rating can be established.

The second purpose is to identify areas of improvement for individual airports that will allow the aviation system to perform more efficiently. Keep in mind that any recommended improvements are based on a high-level analysis of the system and still need to be vetted and supported by local planning efforts by each individual airport. It should not be inferred that the projects included in this document meet FAA justification criteria or that they are endorsed by the FAA or KYTC. Rather, this document serves as one of many factors weighed by the FAA and KYTC in the overall assessment of Kentucky airport project funding.

The benchmarks associated with these performance measures present the minimum level of development that the airport should strive for to meet its recommended system role. It is possible that some airports may have facilities or services that are in excess of those recommended based upon its role. Reduction or removal of facilities and services that exceed the recommended benchmarks was not considered in this analysis. It is possible that airports included in, or recommended for, an airport role may be unable to achieve certain recommended performance measure benchmarks (e.g., environmental constraints prohibit a recommended runway extension). An airport's inability to meet all benchmarks for its role does not necessarily preclude that airport from filling its recommended classification within the system, but may impact its future functionality within the system.

Defining Performance Measures and Benchmarks

Each of the performance measures identified in **Table 8-6** is discussed below. It is important to remember that the benchmarks for each performance measure are not requirements. Each airport's master plan, as well as unique circumstances, will dictate what types of facilities are needed at an individual airport. From a system perspective, these performance measures allow an evaluation of specific system plan objectives (denoted in Table 8-6 and referring back to Chapter 2) as well as general system recommendations to be prepared.

- **Runway Length** – Aircraft with higher speeds and payloads generally need longer runways to take advantage of their full capabilities. As a result, airports with greater economic potential generally need longer runways to accommodate more demanding aircraft and this is reflected in the runway benchmarks.
- **Runway Lighting** – Airports with runway lighting have greater utility since this permits night operations. Additionally, runway lighting can enhance the effectiveness of an instrument approach by making the runway environment easier for pilots to identify during periods of low visibility. The benchmark for runway lighting calls for high intensity runway lights at commercial service airports, where maximum runway utility is called for, and medium intensity runway lights at all but Economic Level 4 Airports.

- **Approach Lighting Systems** – Approach lighting systems assist pilots in identifying the runway threshold environment, helping them transition to the landing phase of their flight. Approach lighting systems are a prerequisite for some types of instrument approach procedures and are a recommended benchmark for Commercial Service Airports where the greatest utility can be obtained from an approach lighting system.
- **Instrument Approach Procedure** – The type of instrument approach at an airport affects the overall utility of an airport and can make it possible to land at the airport during inclement weather. At Commercial Service, Economic Level 1, and Economic Level 2 Airports, the recommended benchmark is an approach with vertical guidance, to support the greater economic potential at these airports by preventing weather diversions to the extent possible. Nonprecision approaches are recommended for Economic Level 3 Airports, and Economic Level 4 Airports do not have a recommended minimum approach type.
- **Fuel** – In order for an airport to fulfill its designated classification, it must provide the basic services to the users of the airport. Fuel is the most fundamental of these services, with users of turbine engine aircraft needing jet fuel and the users of nearly all piston engine aircraft needing 100LL avgas. All system airports, except for Economic Level 4 airports, are expected to be able to fuel piston aircraft, and those airports with significant amounts of jet traffic are expected to have jet fuel (i.e., Economic Level 1, Economic Level 2, and Commercial Service Airports). Additionally, it is recommended that Economic Level 3 Airports provide self-fueling options to pilots.
- **Airport Parking** – The amount of automobile parking available is an important component of providing adequate services to airport users. Since this performance measure is intended to be informational only, no recommended benchmark is established.
- **Snow Removal** – Winter use of airports in Kentucky depends upon the ability to remove snow from the airfield. The two means of providing snow removal at an airport are either for the airport to own, maintain, and operate the snow removal equipment (referred to as on-airport), or contract with another party to provide the snow removal services as needed (referred to as off-airport). On-airport snow removal provides greater reliability, but at higher cost, while off-airport snow removal is typically less expensive, but may not be as responsive in situations where the provider may have higher priority snow clearance duties than keeping the airport clean. On-airport snow removal is the established benchmark for Commercial Service and Economic Level 1 Airports, where maximum operational efficiency is important for supporting the maximum economic potential of these airports. The benchmark for Economic Level 2 and Economic Level 3 Airports is off-airport snow removal, where operational efficiency needs to be balanced against the expense of the service, while no benchmark was established for Economic Level 4 Airports out of cost considerations.
- **Terminal/Administration Building** – Airports that are expected to handle general aviation passenger traffic have a need for a terminal/administration building where passengers can take shelter from the weather and environment, as well as provide a central meeting point for parties coming to the airport. For this reason, a terminal/administration building is recommended for all airports.
- **Taxiway Type** – The type of taxiway system at an airport is important for reasons of safety and efficiency. Without taxiways, aircraft must use the runway to back-taxi in order to line up for takeoff and to exit the runway after landing. This increases runway occupancy times for aircraft, which is both inefficient and increases collision risks for aircraft. Commercial Service and Economic Level 1 Airports are expected to accommodate larger aircraft, which tend to be less maneuverable, giving them a greater need for taxiways. For this reason, full parallel taxiways are recommended for Commercial Service and Economic Level 1 Airports. Economic Level 2 and Economic Level 3 Airports serving more maneuverable aircraft can increase safety and efficiency with partial parallel taxiways without incurring the expense of a full parallel taxiway.

Therefore, partial parallel taxiways are recommended for Economic Level 2 and Economic Level 3 airports. Economic Level 4 airports are recommended for turnaround stubs.

- **Visual Approach Aids** – Visual glide slope indicators assist pilots in guiding their aircraft to the runway threshold along a safe and stable descent. Visual glide slope indicators (the most common being a precision approach path indicator, or PAPI) provide visual feedback to the pilot on his vertical position relative to a fixed path that descends smoothly to the runway. Such systems enhance safety by ensuring obstacle clearance and proper aircraft positioning for a safe landing. PAPIs are a benchmark for all but Level 4 Airports.
- **Runway End Identifier Lights** – Runway end identifier lights assist pilots in finding the runway threshold, especially in areas with substantial background lighting. REILs are a recommended benchmark for all but Economic Level 4 Airports, but only if the airport does not have an approach lighting system, which is a more effective (but costlier) method of directing a pilot's attention to the runway threshold.
- **Automated Weather Reporting** – Weather conditions, especially as they relate to visibility, determine if an aircraft is capable of getting into an airport. Knowing what those weather conditions are ahead of time greatly assists pilots with flight planning. It is also of use when making a diversion decision. Weather reporting at most airports is automated, either an Automated Weather Observing System (AWOS) or Automated Surface Observing System (ASOS). Automated weather reporting is recommended for all but Economic Level 4 airports, where cost considerations make it unfavorable.
- **Airport Beacon** – An airport beacon is a light that aids pilots in identifying the airport from a distance, especially at night. It is a fundamental component of any lighted airport and therefore a benchmark for all but Level 4 Airports.
- **Windsock** – A windsock provides a reliable, easy to use and maintain mechanism for indicating wind direction and speed. It is a fundamental component of any airport and therefore a benchmark for all airports.
- **Airfield Fencing** – Airfield fencing can serve two purposes. It can provide security, and it can enhance safety by preventing wildlife from becoming collision hazards on runways. Full airfield fencing is the benchmark for Commercial Service, Economic Level 1, and Economic Level 2 Airports to protect the more expensive and higher performing aircraft expected to operate at these airports. At Economic Level 3 and Economic Level 4 airports, partial airfield fencing is recommended to serve as a security deterrence.
- **Security Access Control System** – A security access control system helps an airport ensure that unauthorized personnel do not have access to airport areas that are restricted. This system is a recommended benchmark for all but Economic Level 4 Airports, where it is assumed that this component would be cost-prohibitive for many of the airports.

Table 8-6
Performance Measures and Benchmarks

Obj.	Performance Measure	Commercial Service Airports	Economic Level 1 Airports	Economic Level 2 Airports	Economic Level 3 Airports	Economic Level 4 Airports
1.01	Runway Length	6,500 ft.	5,000 ft.	4,000 ft.	3,200 ft.	2,400 ft.
1.03	Runway Lighting	High	Medium	Medium	Medium	N/A
1.04	Approach Lighting System	ALS	N/A	N/A	N/A	N/A
1.05	Instrument Approach Procedure	APV	APV	APV	Non-precision	Visual
1.06	Fuel	Jet-A, 100LL	Jet-A, 100LL	Jet-A, 100LL	100LL, Self-Service	N/A
1.07	Airport Parking	Informational only	Informational only	Informational only	Informational only	Informational only
1.08	Snow Removal	On-airport	On-airport	Off-airport	Off-airport	N/A
1.09	Terminal Building	Yes	Yes	Yes	Yes	Yes
2.05	Taxiway Type	Full Parallel	Full Parallel	Partial Parallel	Partial Parallel	Turnarounds
2.06	Visual Approach Aids	PAPI	PAPI	PAPI	PAPI	N/A
2.07	Runway End Identifier Lights	REILs if no ALS	REILs if no ALS	REILs if no ALS	REILs	N/A
2.08	Automated Weather Reporting	AWOS	AWOS	AWOS	AWOS	N/A
2.09	Airport Beacon	Beacon	Beacon	Beacon	Beacon	N/A
2.10	Windsock	Windsock	Windsock	Windsock	Windsock	Windsock
3.01	Airfield Fencing	Complete	Complete	Complete	Partial	Partial
3.02	Security Access Control System	Yes	Yes	Yes	Yes	N/A

ALS – Approach lighting system; APV – Approach with vertical guidance; AWOS – Automated weather observing system; N/A – Not applicable; PAPI – Precision approach path indicator; RDC – Runway design code; REIL – Runway end identifier lights
Source: CDM Smith.

Using these performance measures and associated benchmarks, Chapter 10: System Evaluation – Facilities and Services will analyze the degree to which airports in each role are meeting their suggested standards, and develop recommendations to address the means by which the system can be improved.

Kentucky Airport System Minimum Standards

In addition to developing benchmarks for the various airport roles in the Kentucky Airport System, this study also considered the minimum requirements necessary for an airport to be included in the system. In developing this set of minimum standards, two key boundaries were used. Minimum standards must not be so low that airports with significant facility needs are brought into the system and place a financial burden on the state. At the same time, minimum standards must not be so high as to present a significant obstacle to expanding the system when necessary.

With these two guiding limits, the following minimum standards for Kentucky's airport system are recommended:

- Airport is open to the public. To be eligible for federal funding, the airport must be open to the public.
- Airport is publicly owned. Publicly owned airports have an easier path to qualifying for federal grants as compared to privately owned airports, so public ownership is a recommended minimum standard.
- Clear visual approach paths (20:1) to both runway ends. This minimum standard ensures the safety of flying in and out of the airport.

- Meet the benchmarks of an Economic Level 4 Airport. From a system perspective, any system airport's performance would be measured, at a minimum, against the benchmarks for an Economic Level 4 Airport. To avoid incentivizing an airport to join the system simply for facility upgrades, it is recommended that an airport meet the benchmarks for an Economic Level 4 Airport prior to admittance to the state airport system. Those benchmarks are:
  - Runway length of at least 2,400 feet and a hard surface.
  - Runway width of at least 60 feet. This is the minimum runway width for any type of runway, per FAA Advisory Circular 150/5300-13A, *Airport Design*.
  - A terminal building for general aviation pilots and passengers.
  - Taxiway turnarounds at each end of the primary runway.
  - A windsock.
  - Partial airfield fencing.

These minimum standards are recommended as part of an overall screening process to vet airports under consideration for inclusion in the state airport system. By encouraging airports to meet these minimum standards prior to inclusion in the state airport system, the demand for improved facilities from new system airports will be diminished.

Summary

This chapter provided an overview of airport system role analysis. It began by reviewing the methodology and reasons behind the FAA's role analysis used in the NPIAS. By showing that the existing roles as defined by the FAA were tailored for a different purpose than what was needed by the Kentucky system plan, it provided the background for developing the logical flow chart process that established Kentucky's airport roles. These roles, determined through the four objective factors of fuel available, runway length, cloud ceiling of the best instrument approach, and relative number of jet departures, were then used to define facility benchmarks. These facility benchmarks were based on the key objectives established in the Goals and Objectives chapter. Finally, starting with the benchmarks established for Economic Level 4 Airports, a set of minimum standards were developed for airports seeking to enter the Kentucky airport system.