Update Airport Layout Plan
Chapter Four

Facility Requirements

Chapter Four – Facility Requirements and Capacity Analysis

4.0 Introduction

Given that future aviation activity levels are determined, the ability of existing facilities to satisfy this demand must be evaluated. Deficiencies identified determine airport needs throughout the 20-year planning period. This chapter examines impacts to the airport due to the forecasts of aviation demand, focusing on five distinct elements:

- ⇨ Airport Role and Service Level
- ⇨ Local Airspace Capacity
- ⇨ Airside Requirements (runways, taxiways and navigational aids)
- ⇨ Landside Requirements (terminal, air traffic control tower, utilities, roads, parking)
- ⇨ Compliance.

Any shortcomings in the ability to serve forecasted demand are highlighted, and recommendations are made regarding physical improvements needed to correct identified shortcomings.

4.1 Airport Role and Service Level

The RCK is currently not classified in the FAA's National Plan of Integrated Airport Systems (NPIAS), but is classified by the State of Texas as a basic facility.

For purposes of this narrative, this type of airport generally accommodates visual A and B aircraft. As described in the Forecasts of Aviation Demand, the Airport is currently accommodating aircraft operations within these weight and speed thresholds.

Short-Term Role and Design Standards

The Inventory and Forecasts of Aviation Demand chapters of this narrative established that the Airport should be designed to comply with A-I standards at minimum. The most demanding aircraft or group of aircraft with similar characteristics that use the Airport on a regular basis, conducting at least 500 annual takeoffs and landings, is termed the critical/design aircraft. This aircraft determines design standards such as runway width, pavement strength and runway to taxiway separation criteria.

Design for airport facilities to accommodate this classification should proceed and future airside and landside facilities should be designed to accommodate these types of aircraft. Note that not all parts of the field require construction based upon these design standards, including any future T-hangar access.

Longer-Term Role and Design Standards

The Inventory and Forecasts of Aviation Demand chapters also establish that the Airport may see small but increasing numbers of turbo-prop and jet aircraft, along with other aircraft which are larger, faster, heavier and more expensive.

This narrative expects that RCK will continue in its role as a community airport for the next 20 years, and perhaps move from a basic airport to a Community Service or Business Corporate facility per the Texas System plan methodology.

Following the initial 10-year term planning period (2013-2023) of this planning effort, it is anticipated that larger, faster and heavier aircraft may frequent the Airport in sufficient numbers to substantiate a change in classification from A-I to B-II.

The critical or design aircraft toward the end of the short-term development period is characterized by the various aircraft which have approach speeds not exceeding 121 Knots, or up to Category B, aircraft wingspans not exceeding 79 feet, or up to Group II, with weights not exceeding 30,000 pounds. The type of aircraft in the B-classification include the small and some mid-size business and corporate aircraft such as a few of the Bombardier, Embraer, Cessna Citation Models; the Lear aircraft models are also a potential user from a general aviation perspective.

In summary, the following design standards are anticipated for these portions of the field in the long-term:

- ✓ Runway 17-35: A/B-II, 30,000 DWG
- ✓ Taxiway A/Connectors: A/B-II, 30,000 DWG
- ✓ Itinerant Main Apron: A/B-II, 30,000 DWG
- ✓ Based Main Apron: A/B-I, 12,500 SWG
- ✓ T-Hangar Access: A/B-I, 12,500 SWG.

4.2 Capacity Analysis

The ability of an airport and its runways to effectively process aircraft operations is quantified in terms of its Annual Service Volume (ASV) and peak hourly Instrument Flight Rules and Visual Flight Rules (VFR) capacities.

Procedures and guidelines in FAA Advisory Circular 150/5060-5 *Airport Capacity and Delay* are employed and analysis follows in Table 4-1.

The airspace structure serving RCK is relatively unconstrained from a capacity perspective and there are no significant airspace conflicts which cannot be reasonably addressed, given that airspace is protected in the future. Existing capacity should adequately serve the anticipated demand through the planning period.

Annual Service Volume

Local meteorological conditions, the airfield configuration, aircraft mix and various runway configurations are some of the elements used to calculate a quantitative breakdown of the Annual Service Volume (ASV). ASV is a reasonable estimate of an airport's annual capacity. It accounts for differences in runway use, aircraft mix, and weather that would be encountered during a typical year.

The ASV at the Airport is 125,000 annual operations without a planned full-length parallel taxiway for Runway 17-35. Table 4-1 depicts the ASV relationship to the 20-year forecast of

Table 4-1
Annual Service Volume and VFR/IFR Hourly Capacities

Year	**Total Forecast Operations**	**% Annual Service Volume**
2013	2,500	0.2
2018	3,600	0.3
2023	5,000	0.4
2032	8,500	0.7

Year	**Peak Hour Operations**	**% VFR Hourly Capacity**	**% IFR Hourly Capacity**
2013	1.3	1.7	2.2
2018	1.8	2.3	3.0
2023	2.5	3.2	4.2
2032	4.2	5.5	7.1

aircraft operations, expressed as a percentage based upon a partial parallel taxiway. FAA guidelines suggest that airport sponsors should initiate planning for capacity improvements when annual aircraft operations reach 60 percent of ASV.

Hourly Capacities

FAA guidance suggests that the peak hour VFR capacity for the existing airfield configuration is 76 aircraft operations, and peak hour IFR capacity for the existing airfield configuration is 59 aircraft operations.

Table 4-1 also presents the peak hour forecast of aircraft operations related to VFR and IFR peak hour capacities, expressed as a percentage. FAA recommends that capacity improvements be initiated at 80 percent of hourly capacity.

Although not part of the above analysis, note that an instrument operation requires the pilot in command of the aircraft to execute the final portion of an instrument procedure beginning approximately 5 miles from the end of the runway and the time required to travel the necessary 5 miles would generally be 5-10 minutes depending upon the aircraft approach speed. Therefore, given that no other aircraft can use the 5-mile path, only 6 to 12 IFR peak hourly operations can be accommodated.

4.3 Airside Requirements

An analysis of the airfield requirements generated from the Forecasts of Aviation Demand include an analysis of wind data, instrument approach capability, area obstructions, runway, taxiway and apron dimensions, pavement strengths and airfield design standards. Landing and navigational aids are also discussed.

Wind Analysis

FAA details the objectives of a wind analysis noting that the desirable wind coverage is 95 percent. That is, a runway, or runways, at a given alignment(s) should have a crosswind component less than a given threshold 95 percent of the time.

These thresholds are: 10.5 knots for small aircraft, 13 Knots for larger general aviation aircraft, and 16 Knots for larger turbo-prop and some jet aircraft and 20 Knots for the largest turbine commercial aviation turbine aircraft.

Data gathered from the weather reporting equipment at KAUS from January 1, 2003, to December 1, 2009, were used to create the wind roses for RCK as shown on the cover sheet of the Airport Layout Plan drawings at the conclusion of Chapter Seven.

These three wind roses are (1) All-Weather (all cloud ceiling heights and all visibilities), (2) VFR (occurrence of cloud ceiling heights greater than 1,000 feet above ground level and visibilities greater than three statute miles visibility), and (3) IFR (occurrence of cloud ceiling heights less than 1,000 feet but greater than 200 feet above ground level and visibilities less than 3 statue miles but greater than ½ mile).

All-weather crosswind coverage's for the conditions at KAUS are as follows as they relate to Runway 17-35's alignment at RCK are: 10.5 Knots: 98.20%, 13 Knots: 99.89%, 20 Knots: 99.99%. The VFR crosswind coverage's for the conditions at KAUS are as follows as they relate to Runway 17-35's alignment at RCK are: 10.5 Knots: 98.12%, 13 Knots: 99.88%, 16 Knots: 99.99%. The IFR crosswind coverage's for the conditions at KAUS are as follows as they relate to Runway 17-35's alignment at RCK are: 10.5 Knots: 99.07%, 13 Knots: 99.62%, 16 Knots: 99.91%.

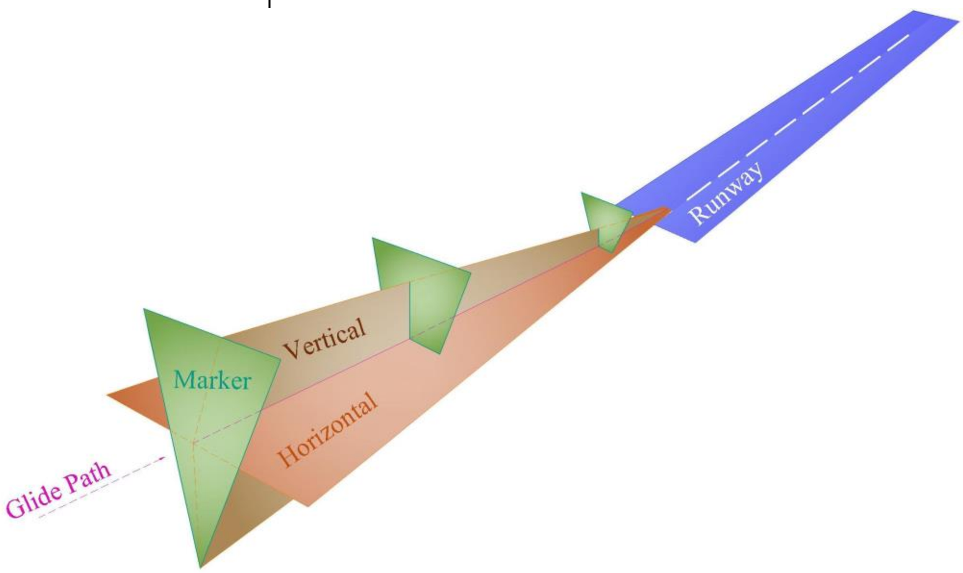
The Airport wind coverage meets or exceeds FAA recommended criteria of 95 percent for the various wind speed categories and directions. Runway 35 appears to provide the best wind coverage for instrument operations.

Instrument Approach Capability

Instrument approach capability is defined based upon the ability of the airport's navigational equipment and/or GPS technology to safely accommodate aircraft operations during periods of inclement weather. FAA categorizes three types of instrument approach capability: precision, non precision and visual. A runway end with precision instrument approach capability is equipped with either ground-based navigational equipment or satellite-based technology that provides vertical and horizontal guidance to a runway end. A runway end with non precision instrument approach capability is equipped with either ground-based navigational equipment or satellite-based technology that provides only horizontal guidance to a runway end. Horizontal guidance allows the aircraft to be piloted in poorer weather conditions, and horizontal and vertical guidance allows the aircraft to be piloted in poorer conditions still. A runway end with visual instrument approach capability is equipped with no equipment or technology and requires relatively clear weather for landing.

The traditional airfield equipment that provides precision instrument approach capability is an Instrument Landing System (ILS). This system generally consists of a glideslope, a localizer, an approach lighting system along with a series of markers to indicate distance from the runway end along a glide path. The glideslope emits a radio signal which allows an aircraft to follow a specific vertical path to a runway end. The localizer emits a radio signal which allows an aircraft to follow a specific horizontal path to a runway end. The approach lighting system allows close-in visual guidance for day and night operations. An ILS can provide the precision instrument approach capability necessary for safe aircraft operation during periods of inclement weather.

Weather, in this regard, comes in two measures, (1) local visibility in statue miles and (2) substantial height of a cloud ceiling above airport elevation. These two measures are termed 'minimums'. An ILS (Category I) allows a properly equipped aircraft, a properly certified pilot and properly equipped airfield to safely complete a landing with cloud ceilings as low as 200 feet with visibilities as low as ½ mile.



FAA is charged with creating paths in the nation's airspace, which allow for safe aircraft operation and landing. These paths nearer to the ground at the nation's airports are termed Instrument Approach Procedures (IAPs). IAPs are instructions for aircraft operators to avoid terrain and obstacles on the way to land on a given runway end. An IAP can be based upon or written for ILS equipment or GPS technology.

GPS-Based Navigation

FAA has participated in establishing the Wide Area Augmentation System (WAAS) program for aviation, using regionally-corrected satellite signals from the Global Navigation Satellite System (GNSS; more commonly known as GPS). Precision instrument approach procedures with ILS-type minima are employed at airports across the country and do not necessitate the expense of ground-based navigational equipment.

GPS-based IAPs are now formally termed RNAV (aRea NAVigation) Approaches. These approaches are built based upon relatively new aviation terminology: waypoints, segments, fixes and points. These combine to create a path in the space above and surrounding the Airport which the aircraft operator must follow to ensure a safe landing.

The typical progression for an RNAV approach using waypoints, segments, fixes and points is described as follows and as illustrated on the diagram on the previous page:

Begin the IAP by maneuvering on the prescribed intercept route or segment from enroute airspace (above 17,999 feet above sea level) to intercept the Initial Approach Fix (IAF). Proceed from the IAF along the initial segment at the prescribed rate of descent to the Intermediate Fix (IF). Proceed from the IF along the intermediate segment at the prescribed rate of descent to the Final Approach Point (FAP). Proceed from the FAP along the final segment at the prescribed rate of descent until (1) the airfield environment is in sight and landing can be initiated, or (2) the Missed Approach Point (MAP) is reached. If the MAP is reached and clouds are too low to the ground or visibility was too low for a safe landing to occur, ascent along the missed approach segment then follows. Although not clearly shown on the diagram, the IAP will then instruct the aircraft operator to maneuver the aircraft safely back to a point where the IAP may be reattempted. Referencing the diagram on the previous page, the airfield will be found between the FAF and MAP, the IAF is typically 10 miles from the subject runway end and the FAF is typically 1 or 2 miles from the runway end.

A series of geometric shapes surround the procedures. These typical surfaces and their dimensions are prescribed in FAA Order 8260.3B *US Terminal Instrument Approach Procedures* (*TERPS)*, and related orders. The elevation of these surfaces and the course upon which they are based is produced by the controlling obstacle height. If no obstacles exist, the height of the FAF, and hence cloud ceiling minima, would theoretically be 0 feet above ground level. The controlling obstacle is the tallest object which penetrates any of the surfaces. Generally the higher the controlling obstacle, the higher the cloud ceiling minima.

In order to maximize the utility of the airport for the flying public, the City should seek an instrument approach procedure to Runways 17 and 35 in the near future. This procedure will be based upon the controlling obstacle and FAA will assign minima for the IAP.

RNAV Approach Procedure Design Criteria

FAA has requirements prerequisite to IAP creation for IAPs based upon GPS technology, including application of the appropriate airport design standards, airfield survey and identification and potential mitigation of area obstructions to navigable airspace. Once appropriate design standards have been implemented, survey completed and obstructions mitigated, FAA may proceed to IAP creation.

FAA has established airport and airspace design guidelines for new RNAV IAPs. Publication of all RNAV procedures is subject to compliance with various design criteria associated with the desired minima and approach capability (precision, non precision or visual). *Airport Design* identifies the best-case minima requirements for new RNAV IAPs, with visibilities greater than ¾ statue mile. These requirements are noted in Table 4-2.

Information describing the various standards and specifications in the table follows:

Height Above Touchdown (HAT) is a calculation that is generally made to consider the desired cloud ceiling minima. HAT is the height of the Minimum Descent Altitude (MDA) above the highest elevation within the runway end environment. Minimum Descent Altitude is an altitude prescribed by an approach procedure below which a pilot should not descend unless able to see the airfield environment during inclement weather on a given glide path. Generally, a glide path angle greater than three percent will increase the HAT and the cloud ceiling minimum established for a given approach.

Although a complete analysis of *TERPS* surfaces for future or ultimate airfield configurations is beyond the scope of this planning, FAA has identified specific guidance for inclusion into *Airport Design*. Guidance therein relates Glideslope Qualification (GQS) and Chapter 3, Section 3 Surfaces. These surfaces emanate from the end of each runway and protect its final approach.

The Airport Layout Plan should show design standards compliance for the desired instrument approach procedures and be approved.

Runways ends should be marked non precision with aiming points.

Connector taxiways should have holdlines and airfield signage located 200 feet from runway centerline.

Medium or low-intensity runway lighting and taxiway extensions should accompany the runway.

Compliance with greater than ¾-mile design standards should be maintained.

FAA advisory circular guidance prescribes vertical and/or non-vertical survey instructions for airfield

Table 4-2
RNAV Instrument Approach Procedure Airport Design Criteria

Standard/Specification	**Runway 17-35**
Height Above Touchdown (HAT)	450 Feet
TERPS Glideslope Qualification Surface	30:1 Clear
TERPS Chapter 3, Section 3 (20:1)	Clear/Night Lighted
Airport Layout Plan	Recommended/Approved
Minimum Runway Length	3,200 Feet
Runway Markings	Non Precision
Holdlines and Airfield Signage from Runway	200’
Runway Edge Lighting	MIRL/LIRL
Parallel Taxiway	Recommended
Approach Lighting	Recommended
Airfield Design Standards	>3/4 Mile
Threshold Siting Criteria (AOCS/DOCS)	20:1 Clear
Approach Survey	Non-Vertical

and obstacle location based upon *TERPS* airspace surfaces and potential obstructions for a proposed approach procedure.

Runway Length

Runway length requirements can be developed based upon the airport role, service level determination and the wind analysis. FAA recommended runway length is a function of airport elevation (noted in feet above mean sea level), mean maximum temperature of the hottest month, (degrees Fahrenheit), aircraft weight (in pounds, maximum gross certificated weight), number of passenger seats, aircraft engine performance, wet/dry condition of the runway and the maximum difference in runway elevation on centerline.

Runway lengths, calculated using the FAA's design software, are identified in Table 4-3 based upon the Airport's 474-foot elevation, 96 degrees temperature along with the current maximum runway centerline elevation difference of 21 feet.

The computer program splits aircraft of all types and sizes into four groups:

1. Aircraft which weigh less than 12,500 pounds with less than 10 passenger seats,
2. Aircraft which weigh less than 12,500 pounds with more than 10 passenger seats,
3. Aircraft which weigh between 12,500 and 60,000 pounds, and
4. Aircraft which weigh more than 60,000 pounds.

The first group of aircraft is split into three sub-sets based upon aircraft performance. One aircraft within the group may perform more poorly than another, solely due to aircraft design and performance characteristics; this aircraft will require a longer take-off run. Aircraft are thus arranged from best to poorest performing and expressed in a percentage of the whole group, with breaks at 75, 95 and 100 percent. The computer program generates a runway length based upon the aggregated performance of the top 75, 95 and 100 percent of all aircraft. For example, runway length generated for 75 percent of airplanes would represent the length required by the top 75 percent of the best performing aircraft.

Table 4-3
Runway Length

Recommended Runway Lengths	**Length**
1. Small Airplanes with Less than 10 passenger seats:	
-75 Percent of these Small Aircraft	2,730
-95 Percent of these Small Aircraft	3,270
-100 Percent of these Small Aircraft	3,910
2. Small Airplanes with 10 or More Passenger Seats:	4,450
3. Large Airplanes of 60,000 Pounds or Less:	
-75 Percent of These Large Airplanes at 60 Percent Useful Load	5,020
-75 Percent of These Large Airplanes at 90 Percent Useful Load	7,410
-100 Percent of These Large Airplanes at 60 Percent Useful Load	6,060
-100 Percent of These Large Airplanes at 90 Percent Useful Load	9,510
4. Airplanes of More Than 60,000 Pounds:	
-Traveling no more than 500 non-stop miles to destination	5,020
-Traveling no more than 1,000 non-stop miles to destination	6,150
-Traveling no more than 1,500 non-stop miles to destination	7,040
-Traveling no more than 2,000 non-stop miles to destination	7,850

No splitting is done for the second group of aircraft.

The third group of aircraft is similarly split, but only into two categories, 75 and 95 percent of the whole, again based upon performance. These two categories are then split in two sub-categories, based upon useful load of the aircraft operation. Useful load includes the weight of fuel, passengers and cargo. The useful load split, either 60 or 90 percent is predicated upon the notion of a longer take-off run.

Finally, runway length requirements for the fourth group are handled in a slightly different manner. The computer program generates a runway length based upon a given distance from the RCK to a destination airport for a given non-stop aircraft operation. The presumption is that the farther the travel distance, the greater the useful load (fuel) required, and the longer the required take-off run. For purposes of reporting, distances are noted in 500-foot intervals.

The Forecasts of Aviation Demand indicate that the airport accommodates and will continue to accommodate increasing numbers of aircraft (1) in the small aircraft {less than 12,500 pounds} category, (2) increasing aircraft weighing between 12,500 and 30,000 pounds and (3) very smaller number of aircraft weighing more than 60,000 pounds traveling less than 1,500 miles.

With respect to (1) above, a runway length should be 4,450 feet. With respect to (2), a runway length should range between 5,020 and 9,510 feet. With respect to (3), a runway length should range between 5,020 and 7,040 feet.

Given that the FAA software used to calculate the runway lengths in Table 4-3 is more than 30 years old and more performance efficient aircraft have been manufactured since then, FAA generally requires an airport sponsor to substantiate runway length requirements. Substantiation takes the form of letters at the behest of aircraft operators.

As can be seen from the above discussion, there is no FAA methodology to determine a *standard* runway length for RCK, only a range of lengths which accommodate certain aircraft types. Analysis for length determination purposes is conducted in the next chapter, as design, land use, economic development, grant assurance compliance, and community compatibility concerns are relevant.

Airfield Design Standards

Existing airfield design standards (A/B-I, Small Aircraft, Greater Than ¾ Mile) along with potential future design standards A/B-II, Large Aircraft, Greater than ¾ Mile) for Runway 17-35 are noted in Table 4-4.

Chapter Two indicates potential for C/D-II operational activity at RCK to reach the FAA guideline of 500 operations at the end of or beyond long-term planning period.

For simplicity sake, A/B-I standards are noted as existing and future and A/B-II standards are noted future.

Notes to the Tables 4-4 and 4-5: [1,2,3]Runway grade, OFZ and approach/departure surface clearance standards are more extensive than identified.

Runway/Airfield Lighting

Both REILS and PAPIs should be installed for Runway 17 and 35. Refurbishment/replacement of these units will likely be necessary toward the end of the planning period. Similarly, the existing Low Intensity Runway Edge Lighting system (LIRL) could be updated to medium intensity along with any runway extension.

Table 4-4
Existing (A/B-I, Small Aircraft, Greater Than ¾ Mile) and
Future (A/B-II, Large Aircraft, Greater Than ¾ Mile)
Airfield Design Standards for Runway 17-35

Standard/Specification	Existing	Future
Runway/Taxiway Width	50'/N/A	75'/35'
Runway Longitudinal Grade[1]	Within ±2% Maximum	Within ±2% Maximum
Runway Pavement Strength (Pounds)	<12,500 SWG	30,000 DWG
Runway 17 and 35 Protection Zones	250'x500'x1,000'	500'x700'x1,000'
Runway Safety Area Width/Beyond End	120'/240'	150'/300'
Runway Object Free Area Width/Beyond End	250'/240'	500'/300'
Taxiway Safety Area Width	49'	79'
Taxiway/Taxilane Object Free Area Width	89'/79'	131'/115'
Runway 17-35 to Parallel Taxiway	150'	240'
Runway 17-35 to Aircraft Holdline	200'	200'
Runway 17-35 to Aircraft Parking	250'	400'
Obstacle Free Zone Width/Beyond End[2]	400'/200'	400'/200'
Runway 17 Approach Clearance (20:1)[3]	250'x700'x5,000'	800'x3,800'x10,000'
Runway 17 Departure Clearance (40:1)[3]	N/A	1,000'x6,266'x10,200'
Runway 35 Approach Clearance (20:1)[3]	250'x700'x5,000'	800'x3,800'x10,000'
Runway 35 Departure Clearance (40:1)[3]	N/A	1,000'x6,266'x10,200'
FAR Part 77 Primary Surface Width/Beyond End	500'/200'	500'/200'
FAR Part 77 Approach Surface, Runway 17	250'x1,250x5,000'; 20:1	500'x3,500x10,000';34:1
FAR Part 77 Approach Surface, Runway 35	250'x1,250x5,000'; 20:1	500'x3,500x10,000';34:1

Although not required, an approach lighting system for Runway 35 is recommended. A segmented circle should be relocated near midfield and the beacon may need refurbishment in the intermediate- or longer-term planning periods.

Taxiway System

The existing taxiway system consists of no full-length parallel taxiway for Runway 17-35. A full-length parallel taxiway to serve the primary runway is a capacity item development item only if proper turns are sited on both runway ends. Runway end turns should be considered for construction with any runway extension. Connecting taxiways should continue to be 35 feet wide, with phased pavement strengths constructed in accordance with Section 4.1 of this chapter, and a minimum separation from runway centerline of 240 feet for A/B-II standards.

Holdlines and signage now at 65 feet from runway centerline should be relocated to a 200 feet separation and the apron relocated. Any future taxiways should be equipped with either edge reflectors or medium-intensity taxiway lights and appropriate airfield signage.

Objects Affecting Navigable Airspace

A controlling obstacle and other obstructions to navigable airspace with proposed dispositions and other objects in the vicinity of the airport are identified on the various drawings in Chapter Five. There are numerous tree and tower obstructions in the airport area which currently require disposition.

Given that the City continues to grow south to the Airport and up and around the field, compatible land use is, and will always be a concern. The next chapter seeks to consider various development options to meet expected demand over upcoming years. Consequential to meeting that demand are airfield improvements which may create obstructions to navigable airspace. Care should be taken when considering options in this regard to minimize adverse airspace impacts. Future applications for changes in land use around the Airport should be scrutinized by the City per City interpretation of Appendix B, and antennas or other tall structures shall be sited/moved to avoid airspace conflicts.

4.4 Landside Requirements

Various landside requirements are generated based upon the forecasts of aviation demand. These relate to apron and circulation area, terminal building and aircraft hangar requirements, aircraft fueling and fueling recommendations, automobile access and area requirements.

Landside facilities are those portions of the airfield which are not directly related to the landing and take-off of aircraft but support it.

Based Aircraft Apron

The existing terminal apron provides an area of approximately 3,000 square yards. This aircraft parking area currently accommodates single-engine and multi-engine itinerant aircraft parking and tie-down needs in a non-standard configuration.

Eight aircraft currently base at the Airport and the based aircraft apron area is, and will continue to be required; most pilots' hangar their aircraft due to personal choice and weather, but reserving one or two spots on the apron for an aircraft pending new hangar construction is prudent. Table 4-5 shows the requirements for based aircraft apron using a standard 600 square yards of area per single-engine aircraft and 800 square yards for multi-engine aircraft. Forecast based aircraft were presented in Chapter Three. Note that these area calculations do not include necessary taxiway and taxilane to parking positions.

As can be seen from the analysis, no additional based aircraft apron will be necessary given that the existing apron is ±3,000 square yards.

Itinerant Aircraft Apron

Apron requirements for itinerant aircraft activity are estimated a bit differently, as shown in Table 4-6. Predicated upon the forecasts of aviation demand, approximately 15 percent of aircraft are eventually expected be in the larger aircraft category including multi-engine piston, multi-engine turboprop and jet aircraft, with the balance in the smaller aircraft category. Itinerant apron required can then be computed as follows: 85 percent (for small aircraft) times 600 square yards per small aircraft plus the quantity of 15 percent (for large aircraft) times 800 square yards per large aircraft is equal to 630 square yards per aircraft {(600 x

Table 4-5
Based Aircraft Apron Requirements

	2013	**2018**	**2023**	**2032**
Forecast Single-Engine Based Aircraft	8	9	10	11
Single-Engine Based Aircraft not Hangared	1	1	1	1
Based Aircraft Apron (Single-Engine) (Sq. Yards)	600	600	600	600
Forecast Multi-Engine Based Aircraft	0	1	2	3
Multi-Engine Based Aircraft not Hangared	1	1	1	1
Based Aircraft Apron (Multi-Engine) (Sq. Yards)	800	800	800	800
Total Based Aircraft Apron Required (Sq. Yards)	1,400	1,400	1,400	1,400

Table 4-6
Itinerant Aircraft Apron Requirements

	2013	2018	2023	2032
Peak Day Operations	8	12	17	28
Peak Day Itinerant Operations	3	5	7	12
Itinerant Aircraft Positions Required	2	3	4	6
Simultaneous Itinerant Aircraft Positions Required	2	2	3	5
Total Itinerant Aircraft Parking Area Required (Square Yards)	812	1,219	1,726	2,844

85%)+(800 x 15%)=630}.

The following is assumed for the calculations in Table 4-6 per FAA estimating guidelines: (1) Peak day itinerant activity constitutes 43 percent of peak day operations, (2) half of these aircraft will require apron parking at some point during the peak day, and (3) approximately 75 percent of peak day transient aircraft must be simultaneously accommodated. Peak day operations were forecast in Chapter Three.

For example, the year 2013 calculation is as follows: 8 peak day operations times 43 percent (peak day itinerant operations) equals 3, divided by 2 (for those that require parking area) is equal to 2. The product of 2 and 75 percent (aircraft that are expected to be simultaneously accommodated) is equal to 1.29. 1.29 times 630 square yards per aircraft is equal to 812 square yards.

As can be seen from the analysis, additional itinerant aircraft apron is necessary in the near future, exclusive of based aircraft parking area.

Terminal Building

A general aviation terminal and administration building should typically provide office space, a waiting room for pilots and passengers, a small area for food and drink vending, a public telephone and public restrooms.

Terminal floor space requirements are a function of the anticipated number of peak hour operations and airport users. Peak hour users are computed as 1.5 passengers per each local aircraft arrival and 2.5 passengers per itinerant arrival. Based upon Table 3-5, a modified 55/45 percent mix of local/itinerant activity is expected in 2032.

Typical floor space requirements, expressed in square feet per user are as follows for general aviation terminal facilities: Waiting Lounge; 15, Office Space; 3, Public Conveniences; 1.5, Concession/Vending; 5, Storage, Circulation, HVAC; 24.5. Terminal building area recommendations are shown in Table 4-7. The

Table 4-7
Terminal Building Requirements

	2013	2018	2023	2032
Peak Hour Operations	*1.3*	*1.8*	*2.5*	*4.2*
Peak Hour Users	*3*	*4*	*5*	*8*
Waiting Lounge	38	53	73	122
Office Space	8	11	15	25
Public Conveniences	4	5	7	12
Vending/Concession	13	18	24	41
Storage, Circulation, HVAC	62	86	119	201
Total Terminal Building Area Required (Square Feet)	124	172	239	401

Airport's terminal will be somewhat adequate for the planning period, though not in its current configuration and condition.

As can be seen from the analysis, additional terminal building will be necessary and refurbishment should be considered in the short-term.

Aircraft Hangars

RCK currently accommodates three conventional hangars totaling approximately 28,675 square feet of aircraft storage area. It is presumed that 100 percent of future based aircraft will require hangar space given current owner preferences. Note that future aircraft may be located in T-hangar units, in more conventional, small box hangars, or collocated with other aircraft in a larger hangar. Furthermore, a single aircraft, only requiring 1,200 square feet, may be located in a hangar with 6,400 square foot hangar, as is the case in several instances at RCK now.

Hangar area requirements found within Table 4-8 are based upon: 1,200 square feet for single-engine piston aircraft, 2,200 square feet for multi-engine piston and twin-turbo prop aircraft, 4,000 square feet for smaller jet aircraft, 12,000 square feet for larger jet aircraft, and 1,500 square feet for helicopter/other.

Support Facilities

As the airport is developed and improvements take place, extensions to existing utility systems should be considered. Future airport users, including individual aircraft owners and corporate interests, should to the extent reasonable be required to participate in the cost of extending utilities to their building and should be charged a connection fee to any system. The fee may be

Table 4-8
Hangar Area Requirements

	2013	**2018**	**2023**	**2032**
Single-Engine Based Aircraft	*8*	*9*	*10*	*11*
Single-Engine Hangar Area Required	9,600	10,800	12,000	13,200
Multi-Engine/Twin Turbo Prop Based Aircraft	0	*1*	*2*	*3*
Multi-Engine/Twin-Turbo Prop Hangar Area Required	0	2,200	4,400	6,600
Jet (Small) Based Aircraft	*0*	*0*	*0*	*0*
Jet (Small) Hangar Area Required	0	0	0	0
Jet (Large) Based Aircraft	*0*	*0*	*0*	*1*
Jet (*Large*) Hangar Area Required	0	0	0	8,000
Helicopter/Other Based Aircraft	0	*0*	*0*	*0*
Helicopter/Other Hangar Area Required	0	0	0	0
Total Itinerant Aircraft Parking Area Required (Square Feet)	9,600	13,000	16,400	27,800

Table 4-9
Automobile Parking Area Requirements

	2013	**2018**	**2023**	**2032**
Peak Hour Users	3	4	5	8
Tenants/Employees	1	2	2	3
Automobile Parking Positions Required	4	6	7	11
Total Automobile Parking Area Required (Square Yards)	140	210	245	385

levied directly or through user fees and leases. Utility extensions should be maintained underground to the maximum extent feasible. Large-scale and corporate development is expected at the Airport. Substantial utilities for these developments are not necessary.

General aviation security requirements do not currently specify access/denial infrastructure or procedures, and aviation industry groups have endorsed various airport watch security programs to protect the Airport and its aircraft from terrorist incidents. These programs focus on informal surveillance procedures and airport user monitoring of airport activities, not necessarily security-related capital improvements. Formal daily airfield and security inspections should be completed and airport emergency and security plans should be drafted as necessary.

Based on the increasing number of aircraft operations by newer-generation and turbine-powered aircraft nationwide, and the opportunity to generate additional airport revenue, it is recommended that the existing fueling capability be supplemented with additional turbine fuel capacity as demand warrants.

Automobile Parking and Access

No paved automobile parking spaces are near the terminal building. Although an expansive formal parking lot may not be necessary, adequate space should be strategically planned and protected. The number of automobile parking spaces required is a function of peak hour users and tenant/employee demand. The peak hour user count was previously derived for the terminal building analysis. The number of tenants and employees at an airport like the RCK is estimated to be one person per five based aircraft. A standard 35 square yards per automobile is used to complete Table 4-9.