Chapter 6 – FACILITY REQUIREMENTS

This chapter identifies the requirements for airfield, terminal and general aviation area facilities to accommodate the forecast demand level. Facility requirements have been developed for the various airport functional areas shown below:

- Airfield
  - Runways and Taxiways
  - Land
  - Instrumentation and Lighting

- Landside Facilities
  - General Aviation Requirements
  - Fuel Storage
  - Aircraft Rescue and Firefighting Facilities (ARFF)
  - Land Requirements

6.01 AIRFIELD FACILITIES

Airfield facilities, as described in this report, include the runways, taxiways, minimum land envelope, and airfield instrumentation and lighting. From the demand capacity analysis, it was concluded that the airport's present runways system will be adequate to accommodate demand throughout the planning period.

6.01-1 RUNWAYS AND TAXIWAYS

The requirements for runways and taxiways may be described in a number of terms. In this study, the following descriptors are used:

- Runway orientation
- Runway length and width
- Pavement strength and grade
- Taxiway system

RUNWAY ORIENTATION

The orientation of runways for takeoff and landing operations is primarily a function of wind velocity and direction taken together with the ability of aircraft to operate under adverse conditions. Generally, the primary runway at an airport is oriented as closely as practical in the direction of the prevailing winds. The most desirable runway configuration will provide the largest wind coverage for a given maximum crosswind component. The crosswind component is the vector of wind velocity and direction, which acts at a right angle to the runway. Further, runway wind coverage is that percentage of time in which operations can safely occur because of acceptable crosswind components. The FAA has set the criterion for desirable wind coverage for a runway system at 95%. A 16 knot crosswind component for an Airport Reference Code D-II airport is 95%.

Dutchess County has a three-runway system, of which 7-25 is a turf runway used primarily for student pilot training. An evaluation of the lightest general aviation aircraft (aircraft

codes A-I and B-I) for worst-case scenario revealed that both Runway 6-24 and Runway 15-33 meet this criterion and together provide a combined wind coverage at 99.6% for 16 knots. Either runway by itself can provide the 95% wind coverage required for Category A-I and B-I type aircraft (10.5 knots). Runway 6-24 provides adequate wind coverage for D-II type aircraft (16 knots).

RUNWAY LENGTH ANALYSIS

The selection of appropriate design criteria to be used for future development at Dutchess County Airport is based primarily upon the critical or design aircraft, which will be utilizing the airport. The critical or design aircraft for the future phases of development is an Airplane Design Group II, Aircraft Approach Category D.

Future activity at Dutchess County Airport will be dependent on future development. Conversations with the airport manager have indicated the primary aircraft that would be using the airport are the Gulfstream IV and Dassault Falcon 900's. The Gulfstream IV falls within Airplane Design Group II (aircraft with wingspans of 79 feet (24m) up to but not including 118 feet (36 m) and Approach Category D (approach speed of 141 knots or more but less than 166 knots). Because the Gulfstream IV is the most demanding aircraft, the runway design will be based on standards for Airport Reference Code D-II.

FAA Advisory Circular 150/5300-13, *Airport Design (for Micro-Computers)*, Version 4.2D, contains criteria that were utilized in developing the runway length required to accommodate a group of airplanes similar to the Gulfstream IV. Factors used in determining the required runway length include:

- Airport Elevation: 165' MSL
- Mean Daily Temperature: 83.80 ° F
- Maximum Difference in Runway Centerline Elevation: 8 Feet
- Length of haul
- Wet or dry pavements
- Aircraft size, approach speed, and load

According to FAA's airport design computer program output, a runway length of 5,070 feet is needed to accommodate large aircraft of more than 60,000 pounds that will be operating at Dutchess County Airport with a 500 mile trip length (see Table 6-1). A runway length of 6,360 feet is required for airplanes of 60,000 pounds or less, at which 75 percent of these large airplanes would be at 90 percent useful load. Runway 6-24 would be able to accommodate the critical design aircraft (Gulfstream IV) anticipated to operate at the Dutchess County Airport by limiting its useful load or trip length.

TABLE 6-1
Airport and Runway Data

Airport elevation	165 feet
Mean daily maximum temperature of the hottest month	83.80 F.
Maximum difference in runway centerline elevation	8 feet
Length of haul for airplanes of more than 60,000 pounds	500 miles
Dry runways	
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with approach speeds of less than 30 knots	300 feet
Small airplanes with approach speeds of less than 50 knots	810 feet
Small airplanes with less than 10 passenger seats	
75 percent of these small airplanes	2,490 feet
95 percent of these small airplanes	3,040 feet
100 percent of these small airplanes	3,620 feet
Small airplanes with 10 or more passenger seats	4,180 feet
Large airplanes of 60,000 pounds or less	
75 percent of these large airplanes at 60 percent useful load	4,710 feet
75 percent of these large airplanes at 90 percent useful load	6,360 feet
100 percent of these large airplanes at 60 percent useful load	5,270 feet
100 percent of these large airplanes at 90 percent useful load	7,870 feet
Airplanes of more than 60,000 pounds	approximately 5,070 feet

REFERENCE: Chapter 2 of AC 150/5325-4A, Runway Length Requirements for Airport Design,

The runway length analysis in the previous *1984 Dutchess County Airport Master Plan* discusses the fact that a longer runway would enable larger business jet aircraft to fly out of Dutchess County with a greater load on hotter days. This would require the relocation of Route 376 to extend Runway 24. In 1981, the NYSDOT had addressed the issue in planning studies examining the proposal to realign Route 376 and found the project to be feasible from an engineering standpoint; however, impracticable, costly and unlikely. Furthermore, the master plan notes that without state support, the burden of the cost of this improvement would fall solely on the FAA and Dutchess County. It would be equally difficult within the current economic climate to justify a slight increase in the length of the runway compared to the relocation of Route 376 to accommodate the runway improvement. Therefore, a runway extension is not recommended at this time.

Runway 15-33 has limited use by Category C and D aircraft and is considered a secondary runway. Based on activity considerations, an Airport Reference Code of B-I is warranted for both existing and future conditions. Currently, the wind coverage for both runways, separately and combined, is adequate and exceeds the recommended 95% wind coverage. FAA AC 150/5325-4 *Runway Length Requirements for Airport Design* states that a crosswind runway should have a length of at least 80 percent of the primary runway length. Therefore, 4000 feet would appear to be the correct length of this runway. Any runway extension to Runway 15-33 would likely occur on Runway 33 end since Runway 15 end is constrained by Wappingers Creek. Therefore, relocation of New Hackensack Road and All Angels Road would be required. Since this runway accommodates mainly Category A and B aircraft, Runway 15-33 meets FAA runway length design criteria for B-I type aircraft and should be maintained throughout the planning period.

RUNWAY WIDTH

Runway width is a dimensional standard that is based upon the physical characteristics of aircraft using the airport. The physical characteristic of importance is wingspan, and in this case, FAA Airplane Design Group II (wingspans up to but not including 79 feet) is used for defining airport dimensional standards. FAA AC 150/5300-13 specifies a runway width of 100 feet. Runway 6-24 meets this requirement. This width should be maintained throughout the planning period (*See* Table 6-2).

TABLE 6-2
Design Standards for Airplane Design Group II
Approach Category D Aircraft

Item	Runway 6-24	Existing Conditions
Runway Centerline to		
-Parallel Taxiway Centerline	300’	350’
-Aircraft Parking Area	400’	450’
Runway Width	100’	100’
Runway Safety Area		
-Width	500’	426’ (6), 500’ (24)
-Length (beyond runway end)	1000’	111’ (6), 300’ (24)
Runway Object Free Area		
-Width	800’	800’
-Length (beyond runway end)	1000’	111’ (6), 300’ (24)
Taxiway Width	35’	50’
Taxiway Safety Area Width	79’	118’
Other Considerations:		
Helicopter Touchdown Pad	500’	1,150’

SOURCE: Tables in Advisory Circular 150/5300-13, 150/5390-2A and C&S Engineers, Inc.

Runway 15-33, which assumes an Aircraft Approach Category B (Speed 91 knots or more but less than 121 knots) and Airplane Design Group I (wingspans up to but not including 49 feet). Runway design standard criteria for this runway requires only 60 feet. Therefore, Runway 15-33 exceeds this standard with the existing 100-foot width. This width should be maintained throughout the planning period.

PAVEMENT STRENGTH

The existing pavement strength for Runway 6-24 is 50,000 pounds for a single wheel, 60,000 pounds for dual wheel, and 110,000 pounds for dual tandem aircraft. The existing pavement strength for Runway 15-33 is 35,000 pounds for single wheel, 45,000 pounds for dual wheel, and 80,000 dual tandem aircraft. Based on maximum gross weights of current and anticipated future critical design aircraft (Gulfstream IV, 71,780 lbs., dual wheel), it should be noted that this aircraft is not anticipated to operate significantly more than 500 annual operations.

Runway 6-24 was scheduled for overlay rehabilitation in 2001. Design on this project was completed in 2002 and construction on this project is expected to be complete in 2003. In the Capital Improvement Program for Dutchess County Airport, a runway overlay project is scheduled for Runway 15-33 in 2005. Additionally, considering the fact that this aircraft would be operating with a limited useful load, the pavement strength at the Dutchess County Airport will be adequate through the planning period.

RUNWAY GRADES

The maximum longitudinal grades for aircraft approach categories A and B is ± 2%, and for C and D, it is ± 1.5%. Gradient changes shall be such that any two points 5 feet above the runway centerline shall be mutually visible for the complete length of the runway. However, if the runway has a full-length parallel taxiway, the runway profile may be such that an unobstructed line of sight will exist from any point five feet above the runway centerline to any other point five feet above the runway centerline for one-half the runway length.

A clear line of sight between the ends of intersecting runway is recommended. Terrain needs to be graded and permanent objects need to be designed or sited so that there will be an unobstructed line of sight from any point five feet above the runway centerline to any point five feet above an intersecting centerline, within the runway visibility zone.

The runway should have adequate transverse slopes to prevent the accumulation of water on the surface. FAA recommends a transverse slope of 1% to 2% from the runway centerline to edges. Based on a site inspection of the airport, both longitudinal and transverse grades meet FAA standards.

TAXIWAY SYSTEM

The taxiway system for Dutchess County Airport should complement the runway system by providing safe access to and from runway and landside areas. Currently, Runway 6-24 has a parallel taxiway accessed by eight exit taxiways. Runway 15-33 has a parallel taxiway with five exit taxiways. There are exit taxiways located at each runway end with several taxiway exits space approximately 600 feet or less along the runway.

The taxiway system should be designed to a minimum width of 35 feet for those associated with Runway 6-24 and 25 feet for those associated with Runway 15-33. They should have a separation of 300 feet from the runway centerline to parallel taxiway for Runway 6-24 and 225 feet for Runway 15-33. The existing taxiway system meets these standards. To

accommodate the average mix of airplanes on runways up to 7,000 feet in length, taxiway exits should be considered at approximately 3,000 feet from the threshold and at approximately 2,000 feet from the stop end of the runway. Presently, Dutchess County Airport provides adequate convenient entrances and exits to accommodate the average mix of aircraft. Therefore, no new taxiways are required for capacity reasons.

SAFETY AREAS

The applicable runway safety area standard for Runway 6-24 is 500 feet wide and extends 1000 feet beyond each runway end. The runway safety area extends only 111 feet beyond Runway 6, and 300 feet off Runway 24.

The applicable safety area standard for Runway 15-33 is 120 feet wide and extends 240 feet beyond each runway end. However, the airport does not meet standards for runway safety areas for Runway 6-24. On the Runway 15 end, there is a drop off of terrain beginning 207 feet from the runway end. At the Runway 33 end, New Hackensack Road (County Road No. 104) intersects the RSA at a distance of 220 feet from the runway.

The Runway Safety Area Determination conducted for the FAA by the NYSDOT dated September 2000 indicates that the relocation of State Route 376, County Road No. 110 and Wappinger Creek off Runway 6-24 is considered environmentally problematic and not feasible. Therefore, it is recommended to relocate the fence line off the Runway 24 end to provide an additional 200 feet of RSA. Since relocating the road on the Runway 6 end is not practicable, no other improvements off the Runway 6 end are considered feasible because of the geographical constraints. It is recommended as part of the Airport Layout Plan to install an Engineering Materials Arrestment System (EMAS) off the Runway 24 end to achieve some leverage in safety, although it is not considered a substitute for meeting a full standard Runway Safety Area. Additionally, it appears to be practical to provide a standard RSA on the Runway 15 end by grading from the drop-off terrain which begins at about 200 feet from 200 feet from the runway end.

The taxiway safety area width for the full parallel taxiway to Runway 6-24 is 79 feet and meets the standard of 79 feet. Turf Runway 7-25 is north of Runway 6-24 and within RSA parallel to Runway 6-24. FAA has issued to the airport an approved declaration for a modification to design standards. The airport currently meets standards for taxiway safety areas and shall be retained throughout the planning period.

OBJECT FREE AREAS

The applicable object free area standard for Runway 6-24 is 800 feet wide centered along the runway centerline and extends 1000 feet beyond each runway end. The applicable object free area standard for Runway 15-33 is 250 feet wide centered along the runway centerline and extends 240 feet beyond each runway end. The airport does not meet standards for runway object free areas for Runway 6-24. The existing object free area extends only 111 feet beyond Runway 6, and 300 feet off Runway 24.

All of the improvements proposed from the Runway Safety Area discussion above apply to the Object Free Areas. It is impractical to relocate New Hackensack Road, County Route

No. 110, State Route 376 or Wappinger Creek. Incremental improvements off the Runway 24 of relocating the fence line to provide an additional 200 feet of RSA will also provide additional Runway Object Free Area. Installation of a an EMAS off the Runway 24 end will enhance safety off the runway, however, it will not substitute for achieving full standard runway safety area or runway object free area. Additionally, it appear practical to grade the ground surface off the Runway 15 end as well as practical to provide sufficient object free area.

6.01-2 AIRFIELD INSTRUMENTATION AND LIGHTING

Instrumentation and lighting at an airport is a prime importance of all pilots and residents concerned. Determining the suitable instrumentation and lighting standards has a prominent influence on airside and landside development.

Table 6-3 lists instrumentation and lighting systems recommended for the airport based upon forecasts, the projected role of the airport, and the standards depicted in FAA Order 7031.2C, *Airway Planning Standard Number One – Terminal Air Navigation Facilities and Air Traffic Control Services*. The only proposed change during the 20 year planning phase is that Taxiway lighting is proposed to be installed on Taxiways "B", "C", and "D" within the 2000-2005 Capital Improvement Plan. Additionally, due to the poor condition of the present Visual Approach Slope Indicator (VASIs), they are recommended to be replaced within the Phase II planning period.

TABLE 6-3
Airfield Instrumentation and Lighting

Item	Existing	Phase I (2000-2005)	Phase II (2006-2010)	Phase III (2015-2020)
Lighting:				
Runway	HIRL, MIRL, MALSR with RAILs, REIL	HIRL, MIRL, MALSR with RAILs, REIL	HIRL, MIRL, MALSR with RAILs, REIL	HIRL, MIRL, MALSR with RAILs, REIL
Taxiway	MITL	MITL (B, C, & D)	MITL	MITL
Navigational Aids:	R/W 06: ILS VOR/DME RNAV or GPS	ILS VOR/DME RNAV or GPS	ILS VOR/DME RNAV or GPS	ILS VOR/DME RNAV or GPS
	R/W 24: VOR/DME or GPS	VOR/DME or GPS	VOR/DME or GPS	VOR/DME or GPS
	R/W 06-24, R/W 33: VASI	VASI	VASI (replace)	VASI
Miscellaneous:	Wind Cone ATIS NDB with Obstruction light AWOS	Wind Cone ATIS NDB with Obstruction light AWOS	Wind Cone ATIS NDB with Obstruction light AWOS	Wind Cone ATIS NDB with Obstruction light AWOS

Legend:

MIRL	Medium Intensity Runway Lights
HIRL	High Intensity Runway Lights
GPS	Global Positioning System
ILS	Instrument Landing System
MALSR	Medium Intensity Approach Light System
RAILs	Runway Alignment Indicator Lights
ATIS	Automatic Terminal Information Service
AWOS	Automated Weather Observation System
MITL	Medium Intensity Taxiway Lights
NDB	Non-direction beacon
REILs	Runway End Indicator Lights
VASI	Visual Approach Slope Indicator
VOR/DME	Very High Frequency Omni Directional Range with Distance Measuring Equipment

SOURCE: C&S Engineers, Inc.

6.02 LANDSIDE FACILITIES

The planning of landside facilities should be based upon a balance of airside and landside capacity. The determination for terminal and support area facilities has been accomplished for the three future planning periods. The principal operating elements covered under this analysis for general aviation requirements include:

- Terminal Building
- Aircraft Parking area
- Hangars
- Automobile Parking

6.02-1 GENERAL AVIATION REQUIREMENTS

General aviation activities require enough space for management offices, lounge areas and restrooms. Dutchess County Airport has separate areas designated for FBO services. The terminal building before August 2001 (Continental Express Airlines discontinued commuter service at the airport) was primarily designated for commuter services. The area requirements for the FBO services were considered separately from the terminal building in order to provide maximum operational efficiency.

The FAA has devised an approach for calculating general aviation terminal requirements that uses operational peaking characteristics to determine size of terminal areas. The method relates general aviation peak hour pilots and passengers to the functional areas within the terminal to produce overall building size. Table 6-4 shows the standard square footage requirements per passenger.

TABLE 6-4
General Aviation Building Requirements

Functional Area	Area Per Peak Hour Pilot/Passenger
Waiting lounge	15.0 SF
FBO Operations	3.0 SF
Public Conveniences	2.0 SF
Concession Area	5.0 SF
Circulation, Storage, HVAC	25.0 SF
TOTAL	50.0 SF

SOURCE*: Federal Aviation Administration, Aviation Demand and Airport Facility Requirements Forecast for Medium Air Transportation Hubs* (Washington, D.C., 1969)

Using the standards in Table 6-4, the recommended general aviation terminal function size for each design year is presented in Table 6-5. Numbers of peak hour passengers shown in the table were derived by assuming 2.5 passengers and pilots per general aviation design hour operation. The 6,400 square footage requirement is currently being met.

TABLE 6-5
General Aviation Terminal Building Requirements

Year	Design Hour Operations	Peak Hour Pilots & Passengers	Terminal Function Size
2005	44	110	5,500 SF
2010	46	116	5,750 SF
2020	51	127	6,400 SF

SOURCE: C&S Engineers, Inc.

AIRCRAFT APRON AREA

The aircraft apron area consists of the hangar/FBO apron, based aircraft apron, and itinerant aircraft-parking apron. Estimations of the needed apron areas are presented in the following sections. Additional apron area will be required to meet future aircraft parking demand.

HANGAR APRON AREA

Hangar apron demands were established using an aviation industry planning guidelines, which indicates a need to develop a hangar apron equal to the hangar area itself. T-hangars do not require aprons, but can be adequately accessed using hangar taxiways. The dimensions of these taxiways will be dependent on the number of T-hangars and their configuration at the airport. Hangar apron demand for conventional hangars has been calculated to be a total of 61,594 square feet (6,844 square yards) for Phase I; a total of 64,374 square feet (7,153 square yards) for Phase II; and a total of 71,914 square feet (7,990 square yards) for Phase III.

BASED AIRCRAFT APRON

The based aircraft parking area is planned to ensure adequate tie-down space for those based aircraft that do not require hangar storage. Currently, the airport has approximately 21,670 square yards (195,000 square feet) of unpaved tie-down area. The paved tie-down area requirements were calculated using a standard of 300 square yards per aircraft. Aircraft identified as desiring tie-down space include 20% of single-engine piston aircraft and 10% of multi-engine piston aircraft. Applying these standards, a total of 10,483 square yards (94,350 square feet) of apron is required for Phase I; a total of 10,991 square yards (98,920 square feet) for Phase II; and a total of 11,668 square yards (105,000 square feet) for Phase III.

ITINERANT AIRCRAFT PARKING APRON

Areas designated for the parking of transient (visiting) aircraft are called “itinerant aprons.” The itinerant apron areas are also used by based aircraft for loading, fuel and other activities.

The size of such an apron required to meet itinerant demand was estimated using the following methodology:

- Assume that a busy day at Dutchess County Airport is 10 percent busier than the average day.
- Assume that 50 percent of the itinerant aircraft will be on the apron at any one time during the day.
- Since 50 percent of the itinerant operations are departures, only 50 percent of the daily itinerant operations will represent aircraft on the ground. Thus, 25 percent of daily itinerant operations will represent transient aircraft needing parking area.
- Itinerant ramp requirements for general aviation aircraft (Airplane Design Group II) likely to use Dutchess County Airport indicate that 400 square yards per itinerant aircraft is a reasonable allotment of space.

Applying this approach to the general aviation itinerant operations forecast yields the demand for apron area shown in Table 6-6. Calculations indicate that transient apron area will need to increase by approximately 200% to meet demand by the year 2020. That translates to a total of 44, 100 square yards for 2005; a total of 46,600 square yards by 2010 and a total of 51,200 square yards by 2020.

TABLE 6-6
Itinerant Aircraft Apron Requirements

Year	Average Busy Day Itinerant Operations	Average Busy Day Itinerant Aircraft	Required Apron
2005	441	110	44,100 SY
2010	463	115	46,400 SY
2020	510	127	51,200 SY

SOURCE: C&S Engineers, Inc.

FIXED BASE OPERATOR MAINTENANCE AREA

Practices concerning fixed base operator (FBO) and maintenance facilities vary. As such, FBO and maintenance area requirements will differ according to the services provided. A frequently used criterion, however is to compute FBO and maintenance areas at ten percent of the total aircraft hangar area or 5000 square feet, whichever is greater. An equal amount of apron area is required for an FBO maintenance ramp. Thus, for Dutchess County Airport, a 23,675 square foot maintenance hangar with a total of 23,675 square feet (2,630 square yards) of adjacent apron space would be the minimum required. Total hangar area required for the planning period (discussed in the next section) is estimated to be approximately 236,675 square feet, and therefore, times 10 percent is equal to 23,675 square feet.

At Dutchess County Airport, an airport tenant Precision Avionics/Aero Mechanical performs aircraft maintenance in a hangar north of Taxiway "D". The hangar facility area is approximately 6,800 square feet with about 9,000 square feet of apron parking area.

Additional general aviation support consists of Line Services operations out of a trailer next to the pilot's lounge. The FBO Line Services area consists of approximately 125 square feet of office space without a specifically dedicated ramp area. The Line Services office is in cramped quarters in the trailer, which is in extremely poor condition. Lines Services does not have anywhere to store ground support equipment; and therefore, stores equipment at the cold storage building.

The airport maintenance/ARFF building contains ARFF and snow removal equipment and facilities. The maintenance/ARFF building facility consists of approximately 6,050 square feet in area and is used only to store and maintain ARFF and snow removal equipment.

HANGAR AREA

Hangar requirements for a general aviation facility are a function of the number of based aircraft, the type of aircraft to be accommodated, owner preferences, and area climate.

Prefabricated conventional, plane-port, and T-hangar units are available from a variety of manufacturers throughout the nation. Storage space for based aircraft was determined using guidelines suggested in manufacturers' literature. Typical aircraft mixes were also reviewed in light of the evolution of business aircraft size. Conventional hangar space was based upon a standard of 1,200 square feet for a single-engine aircraft, 1,400 square feet for a multi-engine piston aircraft, and 1,800 square feet for a turboprop or turbojet aircraft. A standard of 1,400 square feet per T-hangar or plane-port unit was used in calculating area requirements. These hangar areas were then applied to the based aircraft forecasts to determine the actual hangar area requirements for each hangar type. Tie-down space was allocated as part of the itinerant airport apron area and is addressed later in this chapter. The following assumptions were made regarding the type of hangar needed for each type of aircraft:

Percent of Aircraft Type	Type of Storage
100 % of Turbojet Aircraft	Conventional Hangar
55% of Multi-engine Piston	Conventional Hangar
35% of Multi-engine Piston	T-hangar
10% of Multi-engine Piston	Parking Apron
20% of Single-engine Piston	Conventional Hangar
60% of Single-engine Piston	T-hangar
20% of Single-engine Piston	Parking Apron

Using the above assumptions combined with the forecast of fleet mix (shown previously in Table 4-3), Table 6-7 sets forth the demand requirements for hangar space at Dutchess County Airport. For example, for the year 2005, 20% of the 167 based aircraft at the airport is projected to be 33 single-engine planes. Multiply 33 single-engine aircraft by 1,200 square feet and the result of 40,025 square feet of conventional hangar space is required for 2005 for single-engine aircraft. The same calculation method is used for the remaining fleet of jet and multi-engine aircraft for both conventional and T-hangar space requirements. It should be noted that these recommendations are not rigid. For example, the shifting of space requirements between conventional and T-hangars is left to local preference.

TABLE 6-7
Hangar Area Demand (Square Feet)

Item	YEAR 2005	2010	2020
Conventional Hangar			
Single Engine	40,025	41,900	44,375
Multi-Engine Piston	12,250	13,000	12,800
Jet	9,300	9,400	14,700
SUBTOTAL	61,575	64,300	71,875
T-Hangar			
Single Engine	140,080	146,775	155,500
Multi-Engine Piston	7,800	8,300	9,350
SUBTOTAL	147,880	155,075	164,850
GRAND TOTAL	209,455	219,375	236,725

SOURCE: C&S Engineers, Inc.

As previously mentioned in the discussion on based aircraft in Section 4.04-1, the *1984 Dutchess County Airport Master Plan* had identified a deficit of 60 hangar units and recommended an additional 70 units for development over the planning period. This development recommendation has not been implemented to date.

Pilot demand for hangar space at the airport indicates that there is a deficiency presently. Furthermore, the data supports the recommendation that Dutchess County Airport will need to construct both conventional hangars and T-hangars in order to meet future general aviation demand as follows. The airport currently has 69,600 square feet of conventional hangar space out of which AAG, Inc. uses approximately 53,000 square feet for operating their charted helicopter business. Thus, this leaves 16,200 square feet for smaller aircraft (single engine, multi-engine and jets). This space can accommodate approximately 10 aircraft. T-Hangars at the airport consist of one common T-Hangar that contains 20 bays, and another nested T-Hangars that can accommodate 11 aircraft. The T-hangars combined total approximately 31,000 square feet.

GENERAL AVIATION RELATED AUTOMOBILE PARKING

The number of auto spaces required at an airport is also dependent upon the level of general aviation aircraft activity at the facility. The methodology for determining parking needs relates peak hour pilots, passengers, and airport employees to the number of parking spaces required. Numbers of peak hour pilots and passengers were previously derived for the general aviation terminal building requirements. The number of employees relating to the general aviation function of an airport such as Dutchess County Airport is estimated at 1 employee for every 7.2 based aircraft. The number of auto parking spaces equaled the sum of the peak hour pilots/passengers and employees at the airport. This number was converted into paved area by using a planning standard of 40 square yards per vehicle space (refer to Table 6-8). Since the airport can accommodate up to 352 auto parking spaces, there is adequate auto parking area through the planning period.

TABLE 6-8
Auto Parking Area Requirements

Year	Peak Hour Pilots & Passengers	Airport Employees	Total Parking Spaces	Area
2005	110	26	136	5,440 SY
2010	116	30	146	5,800 SY
2020	127	32	159	6,400 SY

SOURCE: C&S Engineers, Inc.

6.02-2 FUEL STORAGE REQUIREMENTS

The projected fuel storage requirements at the Dutchess County Airport were calculated according to the methodology outlined below:

- Calculate the average daily operations for both turbine and piston powered aircraft for each design year.
- Based on historical utilization characteristics at other airports, assume approximately 10 gallons of fuel per turbine operation and 4.2 gallons of fuel per piston operation throughout the planning period.
- Multiply daily results by 14 to obtain a two-week consumption.
- Increase fuel requirements by 10 percent to allow for peaking characteristics in fuel usage.

Table 6-9 shows the results of this methodology calculating fuel storage requirements general aviation activity. Existing fuel storage capacity is insufficient to accommodate fuel storage requirements through the planning period. Therefore, it is recommended to add another 15,000 gallon tank to accommodate Av Gas demand within the 2010-2020 planning period.

TABLE 6-9
General Aviation Fuel Storage Requirements (Two Week)

	Average Daily Operations		Demand (Gallons)		Peak Demand	
Year	Piston	Turbine	AvGas	Jet A	AvGas	Jet A
2005	356	40	20,903	5,530	22,994	6,083
2010	374	42	21,962	5,810	24,158	6,391
2020	411	46	24,184	6,398	26,603	7,038

SOURCE: C&S Engineers, Inc.

6.02-3 AIRCRAFT RESCUE AND FIREFIGHTING REQUIREMENTS

The Federal Aviation Regulation Part 139.315 establishes a system of indexing airports that are regularly served by scheduled commuter aircraft. The overall length of the aircraft having five or more daily departures determines the airport's ARFF index.

The Dutchess County Airport currently operates as an Index A facility. Index A includes aircraft less than 90 feet. The minimum rescue and firefighting equipment and agents required for Index A are as follows:

- The airport must have one vehicle carrying at least 500 pounds of sodium-based dry chemical or halon 1211;

- Or alternatively, 450 pounds of potassium-based dry chemical and water with a commensurate quantity of aqueous film forming foam agent (AFFF) to total 100 gallons, for simultaneous dry chemical and AFFF foam application.

The ARFF vehicle at the airport currently meets FAR Part 139 certification requirements.

6.03 AIRSIDE AND LANDSIDE FACILITY REQUIREMENTS SUMMARY

The preceding sections have identified the general aviation facility requirements for Dutchess County Airport. Tables 6-10 and 6-11 summarize the requirements by planning phase and area of need by comparing existing facilities to total demand for each period.

TABLE 6-10
Airside Facilities Summary

Item	Existing	Phase I (2000-2005)	Phase II (2006-2010)	Phase III (2011-2020)
Runways:				
Rwy 6-24	5,001' x 100' (Paved)	5,001' x 100' (Paved)	5,001' x 100' (Paved)	5,001' x 100' (Paved)
Rwy 15-33	3,005' x 100' (Paved)	3,005' x 100' (Paved)	3,005' x 100' (Paved)	3,005' x 100' (Paved)
Rwy 7-25	1,358' x 100' (Turf)	1,358' x 100' (Turf)	1,358' x 100' (Turf)	1,358' x 100' (Turf)
Taxiways:				
Rwy 6-24	Full Parallel	Full Parallel	Full Parallel	Full Parallel
Rwy 15-33	Full Parallel	Full Parallel	Full Parallel	Full Parallel
Rwy 7-25	None	None	None	None
Pavement Strength				
Rwy 6-24	**60,000 lbs. (DW)**	**60,000 lbs. (DW)**	**60,000 lbs. (DW)**	**60,000 lbs. (DW)**
Rwy 15-33	45,000 lbs. (DW)	45,000 lbs. (DW)	45,000 lbs. (DW)	45,000 lbs. (DW)
Lighting:	HIRL, MIRL, MITL, MALSR with RAILs, REIL	HIRL, MIRL, MITL, MALSR with RAILs, REIL	HIRL, MIRL, MITL, MALSR with RAILs, REIL	HIRL, MIRL, MITL, MALSR with RAILs, REIL
Navigational Aids:	R/W 06: ILS VOR/DME RNAV or GPS	ILS VOR/DME RNAV or GPS	ILS VOR/DME RNAV or GPS	ILS VOR/DME RNAV or GPS
	R/W 24: VOR/DME or GPS	VOR/DME or GPS	VOR/DME or GPS	VOR/DME or GPS
	R/W 06-24, R/W 33: VASI	VASI	VASI	VASI
Miscellaneous:	Wind Cone ATIS NDB with Obstruction light AWOS	Wind Cone ATIS NDB with Obstruction light AWOS	Wind Cone ATIS NDB with Obstruction light AWOS	Wind Cone ATIS NDB with Obstruction light AWOS

Legend:

MIRL	Medium Intensity Runway Lights
HIRL	High Intensity Runway Lights
GPS	Global Positioning System
ILS	Instrument Landing System
MALSR	Medium Intensity Approach Light System
RAILs	Runway Alignment Indicator Lights
ATIS	Automatic Terminal Information Service
AWOS	Automated Weather Observation System
MITL	Medium Intensity Taxiway Lights
NDB	Non-direction beacon
REILs	Runway End Indicator Lights
VASI	Visual Approach Slope Indicator
VOR/DME	Very High Frequency Omni Directional Range with Distance Measuring Equipment

SOURCE: C&S Engineers, Inc.

TABLE 6-11
Landside Facilities Summary

Item	Existing	Phase I (2000-2005)	Phase II (2006-2010)	Phase III (2015-2020)
Terminal:				
GA	8,170 SF	5,500 SF	5,787 SF	6,372 SF
TOTAL:	8,170 SF	5,500 SF	5,787 SF	6,372 SF
Hangars:				
FBO [1]	6800 SF	---	---	---
Conventional	69,600 SF	61,575 SF	64,300 SF	71,875 SF
T-Hangar	31,730 SF	147,880 SF	155,075 SF	164,850 SF
TOTAL	**108,130 SF**	**209,455 SF**	**219,375 SF**	**236,725 SF**
Apron:				
Terminal Area Apron	15,000 SY			
General Aviation				
Itinerant	18,890 SY	48,490 SY	50,930 SY	56,040 SY
Based	9,000 SY	10,480 SY	10,990 SY	11,670 SY
Hangar Related FBO	1,689 SY	6,844 SY	7,153 SY	7,990 SY
TOTAL	**44,579 SY**	**65,814 SY**	**69,078 SY**	**75,700 SY**
Auto Parking:				
Terminal Area Spaces	267	---	---	---
GA Spaces	10	131	152	159
TOTAL	**352**	131	152	159
Area	14,080 SY	5,240 SY	6,080 SY	6,360 SY
Fuel Demand: (Two Week Period)				
TOTAL	65,000 GAL.	29,000 GAL.	30,500 GAL.	33,700 GAL.

[1] FBO Aircraft maintenance is conducted by airport tenant in 6,800 SF Conventional Hangar.
SOURCE: C&S Engineers, Inc.