

Building Area Development



OVERVIEW

The building area of an airport encompasses all of the airport property not devoted to runways, major taxiways, required clear areas, setbacks, and other airfield-related functions. Common uses of building area land at airports similar to Sonoma County Airport, i.e., those offering both commercial and general aviation services, are listed in the box to the right.

This chapter discusses the factors that affect the siting and development of building area facilities at Sonoma County Airport. Two separate types of facility needs are examined: commercial aviation and general aviation. The focus is on providing direction for the appropriate development and use of these Airport building areas.

Typical Airport Building Area Functions

- Air passenger terminal
- Automobile parking
- Rental car pick-up and drop-off
- Administration building or airport offices
- Fixed base operations (FBO) facilities
- Based aircraft tie downs and storage hangars
- Transient aircraft parking
- Pilots' lounge / flight preparation room
- Fuel storage and dispensing equipment
- Aircraft Rescue and Firefighting (ARFF) facility
- Aircraft washing area
- Air traffic control tower

Figure 4A, the Terminal Area Concept Plan and the Airport Layout Plan (ALP) are presented at the end of this chapter.

DESIGN FACTORS

Many factors will influence the planning and, later, the development decisions associated with Sonoma County Airport's commercial and general aviation building areas. Most of these factors can be grouped under four basic headings:

Demand — The forecasts developed in Chapter 2 indicate that additional aviation-related facilities are warranted. In particular, additional air passenger terminal and based aircraft storage facilities will be needed to handle the projected demand.

Setback Distances — The boundary of the airport building area is determined in large part by the necessary setback distances from an airport's runways and taxiways. As discussed in the preceding chapter, the following design criteria are recommended:

- A minimum of 750 feet from the centerline of Runway 14-32, and 500 feet from Runway 1-19 to any future buildings, or fixed or immovable objects;

- A minimum of 93 feet from primary taxiway centerlines to aircraft parking positions and buildings, and 81 feet from taxilane centerlines;
- A minimum of 85 feet between new facing T-hangars, and 100-120 feet between new facing box or corporate hangars (depending on design aircraft wing spans).

These setbacks meet the standards to accommodate regular use by aircraft with wingspans of up to 118 feet (ARC C-III aircraft) on all primary taxiways. Occasional use by aircraft with greater wingspans should be acceptable, provided that the pilots of the larger aircraft exercise appropriate care while maneuvering on the taxiways and apron areas. The lesser dimensions will accommodate light single- and twin-engine aircraft on the taxilanes in the general aviation building area, as well as most small- medium-sized business jets.

Additionally, structures must be sited so as not to block required sight lines for pilots along the runways, and air traffic controllers in the existing and planned airport traffic control tower. Sight line standards for runways and air traffic control towers are contained in FAA Advisory Circular 150/5300-13, *Airport Design*.

Accessibility — An important design consideration is the ease of access to individual portions of the terminal and general aviation building areas from both the runway/taxiway system (airside) and public roads (landside). The general airfield layout is expected to remain unchanged, except for the proposed extensions of Runways 14 and 19 and their associated taxiways. However, modifications to the terminal area access road, general circulation system and parking lots will be required for development of a new air passenger terminal.

Development Staging — Another important factor in the preparation of a building area plan is the timing of future development. The objective is to have a plan that is flexible enough to adapt to changes in type and pace of facility demands, is cost-effective, and also makes sense at each stage of development. Sometimes, the best location for facilities in the short-term may conflict with the optimum long-range plan.

PASSENGER TERMINAL

The existing Sonoma County Airport terminal building is a single-story building located at the western end of Airport Boulevard. The passenger terminal has a total gross floor area of approximately 10,000 square feet in two buildings: a 7,600 square foot lobby and a 2,400 square foot passenger holdroom (this figure does not include overhangs or covered walkways). The lobby area includes the airline ticket office, bag check area, TSA screening, rest rooms, and a restaurant. The restaurant takes up 3,900 square feet, or over 51 percent of the existing terminal building.

Both short-term and long-term passenger automobile parking is located immediately to the east and north of the terminal building. There are currently about 715 parking spaces at the Airport. Of these, 459 are long-term parking spaces and 122 are short-term parking spaces. There are an

additional 132 employee and business-related parking spaces in the terminal area, including 27 reserved for the restaurant and 47 for rental cars. There are also 2 terminal curbside parking places reserved for buses.

Passenger Terminal Space Requirements

A well designed passenger terminal, in terms of size and layout, contributes to the efficiency of an airport's operation and for the passenger, a less stressful travel experience. These factors should be of prime consideration in designing and building a new passenger terminal at STS. Typically, the space requirements of a terminal facility are a function of peak hour demand activity, which is determined from the seating capacity and boarding load factors of aircraft serving the airport.¹ Currently, the Bombardier Q-400 with a seating capacity of 76 passenger seats is the only regularly scheduled commercial airliner using the Airport.² In the future it is anticipated that larger aircraft (from 100 to 135 passenger seats) may use the Airport. This analysis uses the 104-seat Embraer ERJ 190 to represent future conditions. Table 4-1 summarizes projected peak hour passenger levels for current conditions and two projected future scenarios.

Scenario	Peak Hour Enplaned Passengers	Peak Hour Deplaned Passengers	Peak Hour Total Passengers
1 Q-400 (Current)	76	76	152
Projected			
2 Q-400	152	152	304
2 ERJ 190 & 1 Q-400	284	284	568

The existing terminal building and passenger holdroom are currently operating at close to their functional capacity levels. Two or more aircraft loading/unloading passengers at the same time will result in substantial overcrowding of both the terminal building and holdroom.

Terminal Space Requirement Recommendations

This section looks at the requirements to accommodate the above peak hour passenger demand levels and related parking requirements. Table 4-2 summarizes these requirements.

¹ The design peak hour represents 25% of the enplanements for the average day of the peak travel month (ADPM). The peak month is normally considered to represent 10 percent of total annual enplanements.

² A 100% load factor is assumed for the peak hour calculations. Peak hour operations at lower load factors would result in higher levels of efficiency and service within the terminal.

	Scenario		
	One Q-400	Two Q-400s	Two ERJ 190s and One Q-400
Peak Hour Enplaned Passengers ¹	76	152	284
Peak Hour Deplaned Passengers	76	152	284
Total Peak Hour Passengers	152	304	568
AIRLINE / AIRSIDE SPACE			
Airline Ticketing			
ATO Counter – Lineal feet	24	36	48
ATO Office	1,000	1,200	1,400
Baggage Make-up	1,200	2,000	3,400
Baggage Claim			
Baggage Input	900	1,200	2,200
Subtotal Airline Space	3,100	4,400	7,000
CONCESSIONS			
Rental Car			
RAC Counter – Lineal feet	36	36	48
RAC Office Space	700	700	900
Restaurant	3,900	3,900	6,000
Gift Shop	250	500	750
Other Lease Space	1,000	1,500	2,000
Subtotal Concessions	5,850	6,600	9,650
PUBLIC SPACE			
Public Circulation	7,200	12,000	22,500
Public Lobby / Seating	1,400	2,600	4,500
ATO Queue Area	480	720	960
RAC Queue Area	360	360	480
Security Screening Area	600	1,000	1,800
Baggage Claim PAX Area	1,360	2,400	4,400
Baggage Claim Device – Lineal feet	80	160	240
Passenger Hold Room (Secured)	2,400	4,800	8,750
Gates	1	2	3
Restrooms (Unsecured)	1,000	1,800	3,200
Restrooms (Secured)	500	900	1,600
Subtotal Public Space	15,300	26,580	48,190
SUPPORT SPACE			
Airport Administration/Security	3,600	3,600	3,600
Public Meeting/Conference/Exhibit Rooms	1,800	1,800	1,800
Mechanical / Electrical / Janitorial / Storage	1,200	1,200	1,200
Subtotal Support	6,600	6,600	6,600
Subtotal	30,850	44,180	71,440
Building Structure / Non-usable Space	2,820	4,260	6,660
Grand Total Square Feet	33,670	48,440	78,100

Notes: All figures represent square feet unless otherwise noted.
 Calculations based on 100% peak hour load factor.

Sources: FAA AC 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*;
 FAA AC 150/5360-9, *Planning and Design of Airport Terminal Facilities at Non-Hub Locations*; Mead & Hunt, Inc.

Table 4-2

Preliminary Terminal Space Requirements Sonoma County Airport

From Table 4-2 it can be seen that from an ideal terminal design standpoint the existing STS air passenger terminal is about one-third the size normally required to accommodate 152 total enplaning and deplaning passengers during the peak hour through one gate position.³ A terminal of approximately 33,700 square feet would be required to accommodate these 152 peak hour enplaning/deplaning passengers. This, of course, assumes a desire for a high level of passenger service and convenience, and a variety of passenger amenities in addition to the basic requirements for ticketing, baggage handling, security and holdroom functions. It also assumes the inclusion of 5,400 square feet of Airport administrative and TSA security offices, and community meeting, conference and exhibit rooms. It does not assume that the terminal would have only one gate position. A minimum of two gate positions would be required for redundancy, but only one gate position would be utilized during the peak hour period. Similarly, with two gates positioned utilized during the peak hour, a third gate position would have to be available for backup, and so on.

A three-gate terminal designed to accommodate 304 enplaning/deplaning passengers during the peak hour through two occupied gate positions would require an approximately 48,500 square foot terminal building.⁴ This also includes the above 5,400 square feet of Airport administrative and TSA security offices, as well as community meeting, conference and exhibit rooms. With a four-gate terminal, having three gates occupied during the peak hour, a terminal area on the order of 78,000 square feet, including amenities, would be desirable.⁵ Figure 4A, Terminal Area Concept Plan, depicts the site for a new passenger terminal northwest of the existing passenger terminal. This site could accommodate a terminal with up to five aircraft gate positions and is located such that the existing terminal building could continue to operate until the new terminal became operational. The ultimate design of the new terminal will be the subject of a separate study, as will its ultimate space requirements and phasing. This study will also determine what should be done with the existing terminal buildings.⁶ Both the existing aircraft rescue and fire fighting (ARFF) building and the air traffic control tower (ATCT) are proposed to be relocated. The relocation of these two facilities will be the subjects of separate studies.

In association with the new terminal site, a new access roadway would be constructed and the existing parking lots would be reconfigured. The new access roadway would be two one-way lanes into the terminal area from Airport Boulevard, expanding to three lanes in front of the terminal(s), and back to two lanes as it turns back around to reconnect with Airport Boulevard. Although not detailed on the concept plan, there would be bus and taxi access to the terminal curbsides, as well as areas for passenger drop-off and pickup. A separate rental car pick-up/drop-off and storage lot is envisioned for the office building where the Airport administrative office is

³ The existing terminal building has a nominal capacity of around 75,000 annual enplaned passengers. However, more passengers could be accommodated, but with a lower level of service and comfort. Horizon Air's current STS service with three flights a day with 76-seat Q-400 aircraft is equivalent to about 66,500 annual passenger enplanements.

⁴ A 49,000 square foot terminal would accommodate close to 146,000 annual enplaned passengers and provide a high level of passenger amenities and services. This master plan forecasts 200,000 annual passenger enplanements in 2010.

⁵ A 78,000 square foot terminal would accommodate almost 273,000 annual enplaned passengers with a high level of service. This master plan forecasts 262,373 annual enplanements in 2020.

⁶ Possible uses include car rental agencies, a Federal inspection services (FIS) facility for international (Mexico, Canada) flights, stand alone restaurant, or demolition for future terminal expansion.

currently located. Parking for 1,400-1,500 cars would be provided in a combination of short-term and long term parking lots. The ultimate parking requirements and parking lot layouts will be the determined as part of the terminal design study.

Safety and Security

Safety and security requirements for airports that offer scheduled airline service are far more elaborate than at airports that only have general aviation. Since 1970, the FAA has had the statutory authority to issue airport operating certificates to airports served by commercial air carriers. Requirements for obtaining and maintaining the certificate are contained in Federal Aviation Regulations Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*.

The purpose of the certification process is to ensure that commercial passenger service airports meet certain safety standards. These standards include requirements for airport design, construction, maintenance, operations, fire fighting and rescue equipment, runway and taxiway guidance signs, control of vehicles, management of wildlife hazards, and record keeping.

In February of 2004, the FAA issued new Part 139 certification standards that extend the requirements of Part 139 to include airports accommodating air carrier aircraft with more than 10 seats. Sonoma County Airport has a Part 139 operating certificate. To obtain a Part 139 operating certificate, the following must be in place:

- Perimeter fencing and access controls.
- Runway and taxiway guidance sign system.
- Operational surfaces required to meet Part 139 requirements.
- Airport Operations and Emergency Manuals.
- Aircraft fire fighting and rescue (ARFF) equipment.
- Aircraft fire fighting and rescue equipment building.
- Passenger terminal building.
- Qualified airport operations and fire fighting personnel.



Prior to November 2001, commercial service airport security was regulated by the FAA's Civil Aviation Security Division. Federal Aviation Regulations Part 107 established security requirements. The Aviation and Transportation Security Act of 2001 established the Transportation Security Administration (TSA) which now oversees security at commercial service airports. In order to accommodate commercial passenger operations at Sonoma County Airport, the County has modified their existing passenger terminal facility to meet TSA requirements for passenger and baggage screening, hold areas, and administrative areas.

Air Traffic Control Tower

The principal Federal Aviation Administration (FAA) function at Sonoma County Airport is operation of the Airport Air Traffic Control Tower (ATCT). From 0700 local time (LT) through 2000 LT, the tower staff provides ground and local air traffic control services in the immediate vicinity of the Airport. Air traffic controllers must have a clear view of all arrival paths, departure paths and all ground (aircraft and vehicle) movements under their jurisdiction. In this regard, controller line-of-sight is an important factor for evaluating airport improvements and certain off airport development projects.

The tower is located immediately south of the airline terminal building. During heightened threat levels, the FAA requires a 300-foot clear area around the tower. This could result in the closing of the terminal access roadway and much of the short-term parking lot. For operational and security reasons, it is recommended that the tower ultimately be relocated to a point between the runways to enhance visibility between the tower, movement areas, and aircraft on arrival to and departure from the Airport. The best site for the relocated tower will be determined by an independent study.

Aircraft Rescue and Fire Fighting (ARFF)

As mentioned above, because Sonoma County Airport provides commercial airline service, it must be certified under Federal Aviation Regulation Part 139. This means that qualified airport operations and fire fighting personnel, equipment, and vehicles are required to be located on Airport. The ARFF building at Sonoma County Airport is located north of the terminal building. The ARFF facility houses a new, state-of-the-art fire fighting vehicle, and rescue equipment. The ARFF facility will be relocated when the new airline terminal is constructed.

OTHER FACILITY REQUIREMENTS

Numerous facilities are essential to accommodation of future demands for both aviation-related and nonaviation use of the Airport building areas. Identifying these needs is an essential component of facility planning. Airport staff, pilots, and other airport users provided input to this assessment of the future building area facility requirements at Sonoma County Airport.

Aircraft Parking and Storage

Aircraft parking and hangar storage constitutes the most extensive aviation-related use of building area land at Sonoma County Airport. Additional space will be required to meet future demands. In 2005, there are about 416 aircraft based at the airport. This Master Plan forecasts an estimated 57 more aircraft will be based by the end of the 20-year planning period. Several types of facilities will be needed to accommodate this demand.

Aircraft Parking Apron

Airports need paved apron areas for parking the portion of their based aircraft fleet that is not hangared, as well as for short-term use by transient aircraft visiting the airport. Including the airline apron (B), there are seven apron areas at Sonoma County Airport designated as A (transient), C (FBO), D, E, and F. Facilities are available for approximately 596 based and transient aircraft Airport-wide, including 246 County-owned hangars of varying sizes in the southeast quadrant of the Airport (Aprons D and E) and twenty County-owned small hangars in the Apron F area at the south end of the Airport, along with privately-owned hangars. There are an additional 58 fixed-wing aircraft, including jets located in private hangar facilities and 13 aircraft on tiedowns on the east side (including 3 California Department of Forestry and Fire Protection [CDF/Calfire] aircraft. Twelve helicopters are based on the east side including those owned by the Sonoma County Sheriff’s Department and REACH. On the west side, the Experimental Aircraft Association (EAA) maintains facilities for 36 aircraft, including 19 in hangars and 16 on tiedowns.

Aircraft Hangars

As is the case at most general aviation airports, the demand for aircraft parking space at Sonoma County Airport is primarily for hangars. Aircraft storage hangars can be grouped into five general categories, of which all five are currently found at the Airport:

T-Hangars—T-hangars are the most common form of aircraft storage at most general aviation airports including the Sonoma County Airport. The back-to-back arrangement of the individual T-shaped bays is efficient from a structure-size standpoint, but requires taxiway access on both sides of the building. For reasonable economy of construction, T-hangar buildings preferably should contain at least 10 aircraft bays. Hangars of this type are located on Apron D and Apron E.

Rectangular “Executive” Hangars—Rectangular-shaped hangar units are well-suited to locations where access is practical to only one side of the building. The hangar bays are larger than typical T-hangar units and usually are designed to accommodate twin-engine airplanes or small business jets. Alternatively, they sometimes are used for storage of two or three smaller aircraft. The buildings may consist of either single or multiple bays. Some executive hangars have small office areas attached. Hangars of this type are located on Apron E.



T-Hangar



Executive Hangar

Conventional “Corporate” Hangars—Corporate hangars are large, free-standing structures intended to house business jets or multiple smaller aircraft. A size of 10,000 square feet is common at many general aviation airports, although the buildings can be somewhat smaller or considerably larger. Office and pilots’ lounge areas typically are attached. Hangars of this type are mostly located on the southeast side of the Airport, on Apron E.



Corporate Hangars

Shade Hangars—Shade hangars are similar to T-hangars except that they do not have doors or interior partitions. They help keep the sun and rain off the aircraft, but do not provide the security afforded by an enclosed T-hangar. Shade hangars can be constructed advantageously on existing apron pavement in that water drainage through the building is not a concern. Compared to T-hangar construction where existing pavement must be removed and the site regraded, shade hangars may cost only half as much. On raw ground, the differential between the two types is only about 20%. Another good application of shade hangars is in locations where the mass of an enclosed building would act as a visual barrier. The majority of shade hangars at the Airport are located on Apron D.



Shade Hangar

Individual “Portable” Hangars—Portables are small, individual hangars designed to be constructed elsewhere and transported to the airport. They typically are T-shaped, but can be rectangular. An advantage of portables is that they can economically be added in increments of just one unit at a time (the cost per unit, though, is similar to or even higher than the cost of an individual unit in a multiple-unit T-hangar building). Most often they are owned individually rather than by the airport or a hangar developer. Portables also have the advantage of being capable of installation almost anywhere on the airport, including on existing apron pavement or on unpaved areas. A chief disadvantage is that their inconsistency of appearance and often poor maintenance can make them unattractive. Except for five portable hangars located on Apron D, all of the portable hangars at the Airport are located on Apron F.



Portable Hangar

Over the 20-year time frame of the *Master Plan*, a reasonable assumption for planning purposes is that hangar space will be required for essentially all of the 57 additional aircraft expected to be based at the airport.⁷ The greatest need is anticipated to continue to



Tiedown Apron

Spaces for based and smaller transient aircraft are normally equipped with tiedown anchors and chains or ropes to prevent the aircraft from being blown around by strong winds.

⁷ This also assumes that some occupants of existing hangars and tiedowns will want new hangars and that others will occupy the older hangars vacated by those moving into new hangars.

be for T-hangars. Alternatively, shade hangars may be desirable for a portion of this demand. Portable hangars should continue to be excluded from the Airport except under extraordinary circumstances. Only aprons D and E have any potential hangar development space available, and this is very limited. Apron F is currently built out. Both Apex Aviation and the Sonoma Jet Center plan to develop additional hangar facilities on their leaseholds and a private developer is looking at building some new hangars south of Flightline Boulevard immediately east of Sonoma Jet Center and north of Apron D. In addition, there are some infill and redevelopment opportunities around Aprons D and E. The only other area currently suited for hangar development is the area around Apron F. This site has enough available land to accommodate virtually all of the projected hangar demand. An eighteen acre site immediately south of Apron E has been proposed for acquisition. This parcel would logically serve the extension of Apron E and would be ideal for large box and corporate hangar development. In addition to new hangar development, several hangar buildings on Apron D are nearing the end of their useful life and should be redeveloped.

AVIATION SUPPORT FACILITIES

Although aircraft parking occupies the majority of aviation-related building area land at general aviation airports, various other facilities serve essential supporting functions. Among the aviation support facilities that exist and/or may be necessary at Sonoma County Airport are the following:

Airport Administration Building



Many general aviation airports have an administration building that houses not only the airport management offices, but also a pilots' lounge, rest rooms, and other facilities for pilots and the general public. Sometimes a coffee shop or restaurant is included. Because of space limitations the Sonoma County Airport administrative offices are no longer located in the passenger terminal building. The Airport offices are currently located at 2282 Airport Boulevard, east of the terminal automobile parking lot. Other occupants of the building include FAA personnel, Agrilink, Exzel, KLUV radio station, and LightGuard. This building may be demolished as part of the overall terminal development program and the site used for rental cars or parking. The Airport administrative offices would be relocated into the new terminal building.

Fixed Base Operations (FBO) Facilities

Fixed base operators constitute the commercial side of general aviation business. They provide a wide variety of facilities and services for pilots and their aircraft (see adjacent box). Busy airports usually have multiple FBOs, while smaller ones may have only one or none. The primary FBOs at an airport commonly offer many of these facilities and services; specialized FBOs may supply just one. Also, at many airports, the airport operator provides some or all of the hangar facilities and fueling services. FBOs often develop and own their facilities on land leased from the airport, but in many cases both the facilities and the land are leased. Sites for primary FBOs should be situated where they are easily visible and accessible both from the airport's airside and from adjacent roads. Specialty FBO sites can be in more isolated locations, although vehicle access without the need to go through a security gate is desirable.

As noted in Chapter 1, Sonoma County Airport has two primary and several specialty fixed base operators. Plans for long-term development of the Airport's building area should allow for expansion of the existing primary FBOs, as well as establishment of additional specialty FBOs.

Examples of FBO Facilities and Services

- Aircraft rental and charter
- Flight instruction
- Flight preparation room, pilots' lounge, and rest rooms
- Pilots' supplies
- Aircraft and avionics maintenance and repair
- Aircraft fueling
- Based aircraft hangar and tiedown space rental
- Transient aircraft parking

Facilities and services provided by the FBOs at Sonoma County Airport are listed in Chapter 1, Table 1-3.

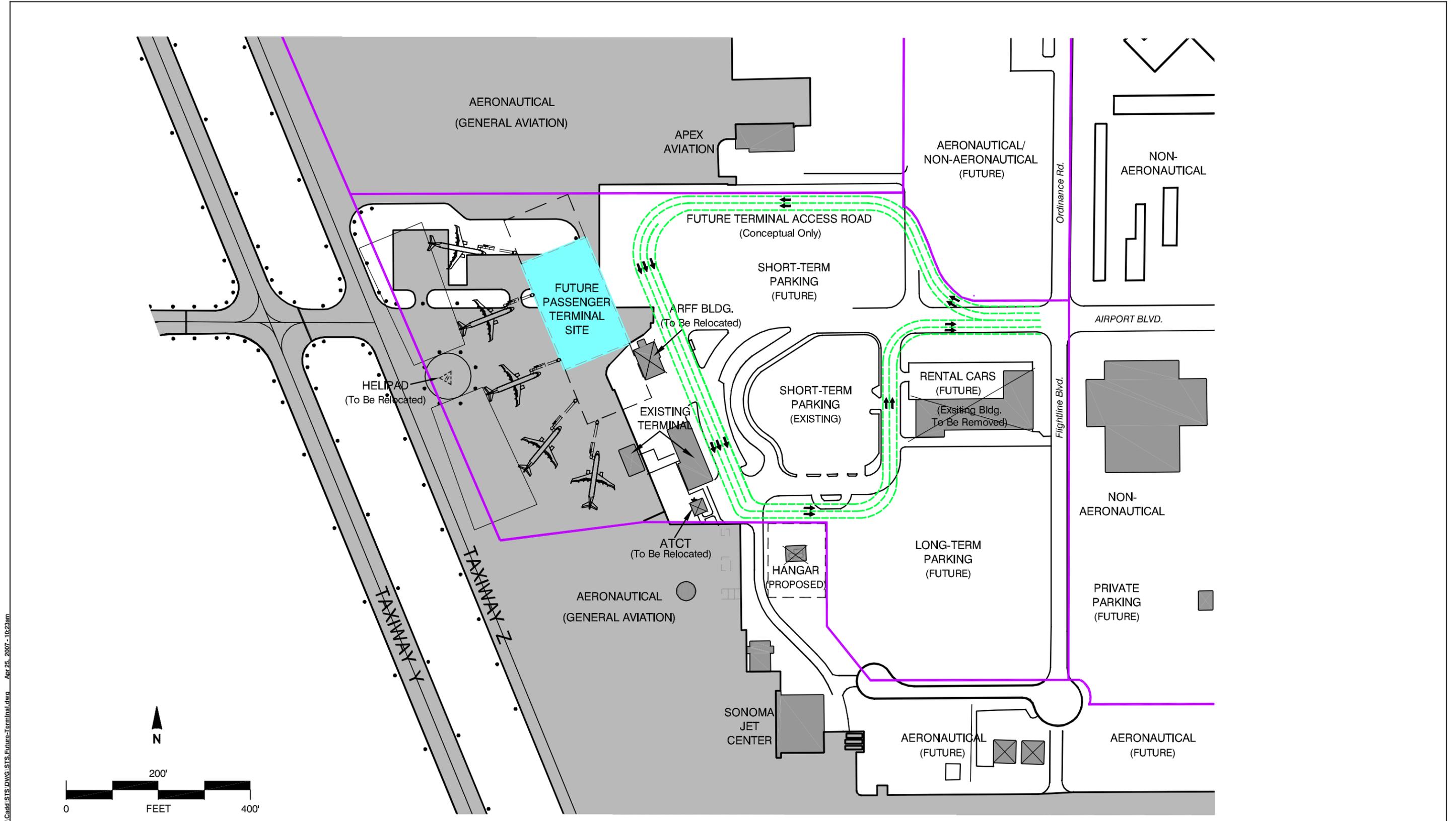
Other Support Facilities

Aircraft Fueling Facilities—Pilots can obtain fuel from two FBO facilities on the Airport. One FBO offers 100 low-lead AvGAS from a card lock self-serve facility located to the east of the "Redwood" hangar. The FBOs also provide 100LL and Jet-A fuel dispensed from fuel trucks. Fuel is available 24 hours a day. The fuel island on apron C south of the terminal building is inactive (as of April 2007). Plans for the relocation of the fuel facility are underway.

Aircraft Wash Rack—The Airport has one designated aircraft washing facility that meets today's standards for run-off pollution control. Any significant new apron development should provide for an additional state-of-the-art aircraft wash rack.

Air Cargo Facility—At present, there is no designated air cargo handling facility at Sonoma County Airport. Two sites on the Airport (on Aprons D and E) are used by FedEx and UPS, respectively, for small package shipments. As cargo volumes increase, some of the cargo will be transported as belly cargo in the baggage compartments of air carrier aircraft. The integrated cargo carriers (e.g., FedEx and UPS) should have their own consolidated air cargo operations area, particularly if strict TSA cargo security requirements are implemented. An area in the vicinity of Apron F has been set aside for this purpose.

The locations of these and other proposed improvements are depicted on the *Draft* Airport Layout Plan at the end of this chapter.



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Source: Mead & Hunt, Inc. (May 2007)

Figure 4A

Terminal Area Concept Plan

Sonoma County Airport

