COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
Aviation Division

BRACKETT FIELD MASTER PLAN

FINAL REPORT

June, 1992

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COUNTY OF LOS ANGELES
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TABLE OF CONTENTS

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
Aviation Division

TABLE OF CONTENTS
(Continued)

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
Aviation Division

TABLE OF CONTENTS
(Continued)

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
Aviation Division

LIST OF FIGURES

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
Aviation Division

LIST OF FIGURES
(continued)

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
Aviation Division

LIST OF TABLES

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
Aviation Division

LIST OF TABLES
(continued)

Section 1
Introduction

GENERAL

Brackett Field, a publicly owned facility, serves the aviation needs of parts of Los Angeles, Orange, Riverside and San Bernardino Counties. The Airport is owned by the County of Los Angeles and operated by the Department of Public Works, Aviation Division. In order to determine the potential of the Airport and specific opportunities for improving facilities, the County applied for a planning grant to the Federal Aviation Administration (FAA) under the Airport Improvement Program (AIP) of the Airport and Airway Improvement Act of 1982. On March 6, 1990, a contract was awarded to P&D Technologies of Orange, California for the preparation of a comprehensive 20-year master plan for Brackett Field.

This document comprises the Final Report for the master plan that documents the research, analyses, and findings of the study. During the course of the study, a number of technical reports were issued which documented the initial elements of the work program such as inventory, forecasts and facility requirements. This Final Report revises and supersedes the preliminary document submissions, and together with a set of airport plans, thoroughly documents the entire work program.

PURPOSE AND SCOPE OF STUDY

The present state of development of Brackett Field has reached the point where its capacity to accommodate existing and additional demand is impaired. To alleviate this situation, it has become necessary to logically plan future facilities. Such a development plan must consider all of the factors necessary to properly develop the Airport over a 20-year planning period. Consideration must be given to the interaction of airport operations and demand between other neighboring aviation facilities.

The main objective of this study is the preparation of an Airport Master Plan to determine the extent, type and schedule of development needed to accommodate future aviation demand at the Airport. The recommended development shall be presented in the following three planning periods: short-term (1992-1995); intermediate-term (1996-2000); and, long-term (2001-2010). The recommended development should satisfy aviation demand and be compatible with the environment, community development and other transportation modes. Above all else, the Plan must be technically sound, practical and economically feasible. The following objectives shall also serve as a guide in the preparation of the study:

- To provide an effective graphic presentation of the ultimate development of the Airport.
- To establish a schedule of priorities and phasing for the various improvements in the Plan.
- To present the pertinent backup information and data which were essential to the development of the Master Plan.

- To describe the various concepts and alternatives which were considered in the establishment of the proposed Plan.

- To provide a concise and descriptive report so that the impact and logic of its recommendations can be clearly understood by the community the Airport serves and by those authorities and public agencies that are charged with the approval, promotion and funding of the improvements proposed in the Master Plan.

- To insure that the Airport thoroughly complements and supports development envisioned in the County and neighboring cities.

- To assess future environmental impacts on land surrounding the Airport and provide recommendations to discourage incompatible development.

- To insure reliability and safety of airport operations.

THE PLANNING PROCESS

A transportation planning study, such as this, is accomplished by following some fundamental, sequential steps that are briefly stated as an overview of the work to be accomplished. The initial step involves taking inventories of existing facilities and systems, conducting surveys of existing and potential users, documenting existing conditions, and coordinating activities with other agencies. Next, air traffic demand forecasts are prepared and then translated into a listing of required facilities. Once this list is determined it is possible to compare requirements with existing facilities to identify deficiencies. Alternative development concepts that satisfy the deficiencies are then developed and evaluated so that a recommended concept is identified. Once identified, the preferred alternative is then detailed and examined in terms of a staged development plan and capital cost estimates, environmental impacts, economic feasibility and financial programs. This report documents the basic steps outlined above that were accomplished in preparing the master plan.

Section 2
Executive Summary

INTRODUCTION

The findings, conclusions, and development recommendations of the Master Plan study are highlighted in this executive summary. It should be noted that the development recommendations contained in this report are based upon projected traffic levels and attainment of these levels. It cannot be overemphasized that where development is recommended based upon demand or traffic levels, it is ***actual***, not forecast, demand that dictates the timing of construction. However, for planning purposes, a schedule must be provided and this schedule is based upon the forecasts of traffic presented in Section 4.

It is also important to point out that the schedule of improvements proposed in this plan is contingent upon the availability of Federal, State, and local funds and private investment. While improvements are scheduled for specific years in this report, it must be remembered that it is the programming of the Airport Improvement Program by the FAA that will determine the timing of projects eligible for FAA funding assistance. Development projects at Brackett Field must be reconciled with the development priorities of other airports in the region. Additionally, since the Airport is one of five owned by the County of Los Angeles, improvements and capital investment must be prioritized with other airports in the County airport system. In terms of projects not eligible for FAA monies, the implementation will depend on the availability of local funds or private sources. Thus, the implementation of recommendations will depend upon FAA programming and funding availability, as well as the attainment of the projected traffic levels.

STUDY RESULTS

The following paragraphs highlight the air traffic forecasts, the sequencing of major development recommendations and the estimated cost of implementing each phase of the plan.

Air Traffic Forecasts

Aviation demand forecasts are projections of air traffic levels at an airport. In the case of Brackett Field, a general aviation airport, the forecasts focus on the number of aircraft based at the Airport, and the number of operations (takeoffs and landings). The forecast of based aircraft is presented in Table 2-1. A based aircraft is one that is permanently stationed at an airport, usually by some form of agreement between the aircraft owner and the airport management. This forecast value is useful in developing projections of aircraft activity, as well as determining future needs of certain airport elements. As seen, the number of based aircraft are projected to increase from present levels close to 500 to 622 in the year 2010.

Aircraft operations are projected to increase from 1990 levels of nearly 265,000 to 357,000 by the year 2010 as presented in Table 2-2. Approximately 60 percent of the takeoffs and landings will be by small, single engine piston aircraft. Helicopters are also expected to account for a major portion (nearly 25 percent) of aircraft operations in the year 2010.

Table 2-1
FORECAST OF BASED AIRCRAFT

Aircraft Type	1990	1995	2000	2005	2010
Single Engine Piston	443	468	494	518	543
Multi Engine Piston	29	31	34	37	40
Turboprop	3	4	4	6	7
Business Jet	6	6	7	8	9
Rotorcraft	11	14	16	20	23
Total	**492**	**523**	**555**	**589**	**622**

Note: Based aircraft do not include aircraft that would be operated by the Sheriff Department Aero Bureau.

Source: P&D Technologies

Table 2-2
FORECAST OF AIRCRAFT OPERATIONS

Aircraft Type	1990	1995	2000	2005	2010
Single Engine Piston	175,300	185,400	195,800	206,400	216,800
Multi Engine Piston	31,700	34,100	37,000	40,200	43,200
Turboprop	4,700	6,000	7,100	8,500	9,900
Business Jet	1,500	2,100	2,700	3,300	4,000
Rotorcraft	51,400	60,700	65,400	73,800	83,100
Military	150	150	150	150	150
Total	**264,750**	**288,450**	**308,150**	**332,350**	**357,150**

Note: Does note include approximately 11,000 annual operations, primarily rotorcraft, generated by the Sheriff Department Aero Bureau's proposed project.

Source: P&D Technologies

Recommended Development

In order to accommodate the anticipated activity, a phased development program has been recommended. As envisioned, Brackett Field will continue to consist of the present two parallel runways, designated as Runways 8R-26L and 8L-26R. Most development focuses on additional hangars, however, some airfield improvements are recommended to meet FAA airport design standards or enhance operations. The Airport Layout Plan (ALP), Figure 2-1, delineates the recommended development.

A goal of the study was to promote orderly expansion of Brackett Field. To achieve this, specific uses are suggested for certain areas of airport land and include aircraft storage, helicopter and business aircraft areas. The design of the phased development program is highlighted below.

Phase 1 Development

Phase 1, or short-range, development at Brackett Field encompasses the first five-year period (1991-1995) of the overall plan. The Phase 1 recommendations are:

- Widen Runway 8R-26L to a width of 100 feet to meet FAA standards for a precision instrument runway.

- Relocate existing Remote Transmitter antennae and equipment shelter to allow for development of Helicopter Area. Relocation to the south side of the airport on the hill near the existing Rotating Beacon is recommended. The final location will be determined by the FAA Airways Facilities Division.

- Construct an angled exit taxiway on the north side of Runway 8L-26R near the control tower to facilitate access to the north hangar area from Runway 8R-26L.

- Construct 6,400 SY of apron for use as tie-down, transient parking, and taxilane (for hovering) in the new Helicopter Area.

- Widen South Taxiway and Taxiway F south of Runway 8R-26L to 40 feet. Portions of the South Taxiway are only 25 feet wide and do not meet FAA taxiway standards of 35 feet. A width of 40 feet is recommended to conform to prevalent taxiway widths at the Airport.

- Construct Medium Intensity Approach Light System with sequenced flashers (MALSF) on Runway 26L.

- Construct 10,000 gallon underground fuel tank.

- Construct an airport maintenance/shop facility. This will permit the existing building to be used for it's original purpose as storage for the fire truck.

- Construct 2,900 SY of auto parking in the new Helicopter Area.

- Construct 15,000 SF hangar and adjacent apron in Helicopter Area.

- Construct 21,000 SF hangar in Business Aircraft Area.

- Relocate existing Port-a-Ports. Some of the portable hangars located along the southeast apron should be relocated to allow for construction of Executive hangars

as shown on the ALP. The need for space will dictate the number of portable units to be moved. Due to their mobility, the units may be relocated to any number of locations on-airport.

- Construct two 16 unit hangar buildings in the Business Aircraft Area. This will be constructed on existing apron in the southeast corner of the airport. The total hangar space provided will be 42,212 SF.

- Automated Surface Observing System (ASOS)

- Develop approximately 10 acres of the vacant northwest parcel for use by the County's Sheriff Department Aero Bureau.

During the preparation of the airport plans, it was announced that the Los Angeles County Sheriff's Department proposed to relocate the Aero Bureau Facility from its existing location at Long Beach Airport to a new site at Brackett. The proposed relocation is intended to provide the Aero Bureau with more helicopter landing and vehicle space, to reduce the Aero Bureau's operating costs, and to provide a central location in Los Angeles County for Aero Bureau operations.

The proposed site is the vacant and undeveloped parcel located at the northwest corner of the Airport. The project site will be purchased by the County for the Sheriff's use. A single building, two story concept containing approximately 65,000 SF is programmed for the Aero Bureau. This accounts for a maintenance hangar of 32,000 SF, maintenance shops of 22,500 SF, and on the second level, an administrative/operations area of 11,500 SF. The building structure will utilize a steel-frame system with a total height of approximately 40 feet and a large, 80-foot wide by 400-foot long hangar area. Airside site requirements include twelve helicopter tie-down pads, two approach and takeoff areas, three fixed-wing parking areas, a taxiway connector, wash rack, and a paved exterior storage area. Landside site requirements include 116 automobile parking spaces, six fuel storage/liquid-waste tanks, a truck-receiving area and access roadways. Construction of the facilities is estimated to be completed by January 1994. The Sheriff's Department Aero Bureau estimates approximately 30 operations will occur daily, based on existing patterns at the Long Beach facility.

A major theme of the Phase 1 period is the development of the north side of the Airport. This includes development by the Sheriff's Department Aero Bureau and initial development of the new Helicopter Area to provide a central area, dedicated for rotorcraft. The existing Remote Transmitter will need to be relocated in order to permit development in this area of the Airport. Helicopter traffic has proliferated at Brackett Field in recent years and a separate area for helicopters will alleviate conflicts between fixed-wing aircraft and helicopters.

Phase 2 Development

Medium-range development, covering the five-year period 1996-2000, is depicted on the ALP as Phase 2. The following improvements are recommended during this period:

- Construct holding apron for departures on Runway 8R.

- Install Medium Intensity Runway Edge Lights (MIRL) on Runway 8L-26R. This project will increase the utility of the runway during nighttime periods and as such will enhance capacity. Runway 26R would qualify for the installation of Runway End Identifier Lights (REIL), at present traffic levels, if the runway was lighted. Therefore, the runway lighting project should also include the installation of REIL on Runway 26R.

- Install Precision Approach Path Indicator (PAPI) system on Runway 26R.

- Construct a 15,000 SF hangar with associated apron, and expand parking apron in Helicopter Area. An additional 6,400 SY of apron will be added during this phase and complete the helicopter parking development in the area.

- Construct two Executive hangar buildings providing 32 spaces, totalling 49,824 SF, in the southeast corner.

- Construct 21,000 SF conventional hangar in Business Aircraft Area.

- Expand auto parking in Helicopter Area.

Phase 3 Development

Development recommended under Phase 3, or the long-range portion of the plan, covers the final ten-year period considered during this Study, 2001-2010. As such, the improvements discussed below are considered to be of the lowest priority and implementation is recommended only if activity materializes as forecast in this Study. Recommendations for Phase 3 development consist of the following projects.

- Install PAPI - Runway 8L. It is noted that the timing of this improvement is based on the forecast of qualifying aircraft operations for the runway. It is further noted that this project would have noise benefits as it would assist aircraft approaching from the west in maintaining proper altitude which also will serve in providing maximum separation from existing residential development located in the hills northwest of the Airport. Thus, acceleration of the timing of this improvement should be considered should funding be available.

- Construct 21,000 SF conventional hangar in Business Aircraft Area. This will complete the hangar development in this area.

- Remove and replace two existing County T-hangars along McKinley Avenue. These hangars are among the oldest on the airport and date to the 1960s and are in fair condition. It is recommended to replace and reorient these buildings based upon the following rationale:

  - The cost to renovate and maintain old buildings in fair condition does not appear to be a cost effective approach. Provision of new facilities as opposed to rehabilitation would be more economical.

  - Reorientation of the buildings as shown on the ALP provides a more efficient use of land and will provide space for development of additional conventional hangar space. The north-south orientation shown accommodates two 26-unit T-hangars, plus two shorter rows of 12-unit buildings. The longer, 26-unit buildings should be portable units due to an MWD easement that traverses the area. The two smaller, 12-unit buildings can be located in the area to the west. These can be either portable or permanent structures.

Financing

Implementation of the recommended development plan will require the expenditure of some $9.1 million during the 20-year planning period. Approximately 10 percent of the total development costs are eligible for Federal and State aid. Funds will be obtained from various sources including the FAA, State, County (public investment) and private investment. The major portion of capital costs in the plan reflect development of new hangars. Private investment will be required to construct hangars, as these projects are not eligible for funding through the FAA Airport Improvement Program. Table 2-3 summarizes the program expenditures.

Table 2-3
SUMMARY OF CAPITAL IMPROVEMENT COSTS
(1991 Dollars)

Timing	Public Investment	Private Investment	Total Investment
Phase 1	$807,000	$3,368,900	$4,175,900
Phase 2	314,100	2,690,000	3,004,100
Phase 3	15,000	1,857,500	1,872,500
Total Plan	**$1,136,100**	**$7,916,400**	**$9,052,500**

Total public investment is estimated to equal $1.1 million, in 1991 dollars, for all three phases of the planning period. When including private investment items, projects not eligible for federal or state funding assistance, the total development program costs will equal $9.1 million in 1991 dollars. This does not include development costs of the Sheriff's Aero Bureau facility.

Total Federal, state, and local government funding for capital improvements over all three phases of the Master Plan is estimated, in current dollars, to be:

- Federal AIP Funding - $1 million
- State Funding - $25,000
- County Funding - $110,000

County funds represent the airport sponsor's matching share under the FAA AIP grant program.
Total private investment in the Airport is estimated to total $7.9 million, in current dollars 1991 dollars, and represents projects ineligible for FAA funding. For the most part these costs include development of hangars recommended in the plan, but also would include auto parking and apron in the immediate vicinity of a private hangar and fuel facilities. The private investment can be provided by private sources, or the County could elect to fund projects, such as hangars, out of the County's airport fund.

Local Coordination

In accordance with an agreement between the County and City of La Verne regarding consistency of new development at Brackett Field with the City's General Plan, the County agreed that it will in good faith involve the City and the City agreed to participate in the development of any proposed Master Plan for the airport in recognition of the City's interest in the nature of the future planning of undeveloped areas of the airport, particularly as these areas are adjacent to and visible from City regulated properties. However, as airport sponsor, the County retains principal permitting authority for proprietary airport development. It should also be noted that under federal law (Federal Aviation Regulation Part 77, Objects Affecting Navigable Airspace), proposals for new development or alterations off-airport may require notification to FAA for review of possible airspace impacts.

Environmental Considerations

Environmental analysis in this master plan culminated in the preparation of an Initial Study and Negative Declaration (Initial Study), a separately bound, volume to this Final Report. The analysis included the preparation of existing and future CNEL noise contours, as well as many other aspects. The interested reader is directed to this volume for details.

For the purposes of this summary, the Initial Study concluded that the projects recommended in the Master Plan will not have a significant effect on the environment, and thus a Negative Declaration was prepared in accordance with the California Environmental Quality Act (CEQA). Although no environmental effects were determined to be significant, the Initial Study includes some mitigation measures that were developed to lessen effects of airport activity and enhance airport compatibility.

Section 3
Inventory

INTRODUCTION

This section documents the number, type and general condition of the existing facilities that comprise Brackett Field Airport (POC). It is a complete compilation of all systems, including airfield, terminal area, ground access, parking, Navaids, pavement conditions, utilities and the physical characteristics of the airport site.

The purpose of performing a comprehensive inventory of existing facilities is that, in later phases of the work program, the facilities will be assessed as to their capacity to accommodate future traffic volumes. By comparing the capacity of existing facilities with future traffic volumes (demand/capacity analysis), capacity deficiencies may be determined. Once the deficiencies are identified, alternative expansion concepts (capable of accommodating future demand) can be formulated, evaluated and ultimately, a recommended development program is formulated.

The following subsections document the findings of the facility inventory work. Before proceeding with a discussion of airport facilities, a brief history of the Airport is presented.

AIRPORT HISTORY

The Airport began its existence as a dirt strip graded out of a wheat field in the mid 1930s. Two private pilots working as flight instructors leased 50 acres from the property owner, the Baseline Water Company, and developed the field into an organized airstrip in the early 1940s. The runway was 2,400 feet long and 550 feet wide and other development included a six-aircraft hangar, office, maintenance shop and coffee counter. The Civil Aeronautics Administration formally opened the field as an approved airport on October 15, 1940. It was named after Dr. Frank Brackett, one-time president of Pomona College and a flying enthusiast. In 1942, the Airport became headquarters for a Civil Air Patrol Squadron under the authority of the Department of Defense.

In 1947, the Regional Planning Commission of L.A. County recommended that the Board of Supervisors acquire land so that federal funds could be obtained for developing a major private airport in the eastern portion of the County. Brackett Field was a primary site that was considered. Eventually in 1955, the County obtained 170 acres of the field through condemnation. In 1956, $500,000 from the Commerce Department was obtained by the County to improve the airfield. Improvements included land acquisition, runway paving and lighting and in August 1958, the Airport was officially dedicated as a Los Angeles County Airport. In the 1960s, there was scheduled air service provided by Golden West with six daily flights to LAX, but losses were great and service was suspended after one year. In 1961, the FAA authorized the establishment of a control tower at the Airport.

EXISTING AIRPORT

Brackett Field is situated in the southeastern corner of Los Angeles County, roughly 28 miles from downtown Los Angeles. The proximity to Los Angeles International Airport

(LAX) and other air carrier airports creates a unique environment in terms of aircraft operations and airspace utilization. The Airport, as stated above, is owned by Los Angeles County and operated through its Department of Public Works - Aviation Division. The Airport enjoys excellent ground access to Interstate 10 (San Bernardino Freeway) which is approximately two miles to the south, Interstate 210 (Foothill Freeway), State Highways 57, 60 and 71. The regional highway system is graphically presented in Figure 3-1, Vicinity Map.

Brackett Field functions in several roles as defined by FAA. First, it is a general aviation airport which means it enplanes less than 2,500 annual passengers and is used exclusively by private and business aircraft that do not provide common-carrier passenger service. For comparison with other neighboring airports, LAX is a primary airport which is defined as a public-use commercial airport enplaning at least 0.01 percent of all passengers enplaned annually at U.S. airports. Chino and Fullerton Airports are examples of other general aviation airports in the region.

Brackett Field is contained in the National Plan of Integrated Airport Systems (NPIAS) and is classified as a general utility airport which is defined as an airport that is designed to serve all airplanes classified by FAA as Aircraft Approach Category A and B. These are aircraft with approach speeds up to but not including 121 knots. Along with its role as a utility airport, Brackett Field has also been designated as a Reliever airport by the FAA. These are general aviation airports that have the function of relieving congestion at primary commercial airports (Ontario in this case) and providing more access for general aviation to the overall community.

Along with the above airport classifications, Brackett Field is designated as "Urban Core" airport by the Southern California Association of Governments (SCAG)[1]. SCAG has categorized GA airports in the region as "Urban Core", "Urban Fringe", or "Remote" based on the population base and aviation demand. Generally the core airports will be very active and at or near capacity, while the remote airports will usually operate at levels much less than capacity.

Planning standards contained in FAA AC 150/5300-13, Airport Design, will be applied in this study of Brackett Field and will use standards for Airplane Design Group II aircraft. These are aircraft with wing spans from 49 feet up to but not including 79 feet, and insures that essentially all general aviation aircraft that could be expected to use the Airport will be accommodated by facilities of appropriate design. However, in cases where facilities are used by small (less than 12,500 pounds), Airplane Design Group I aircraft, the applicable standards will be used.

[1]Southern California Association of Governments, General Aviation Systems Study - Phase II Report. December 1987.

AIRSIDE FACILITIES

The term "airside" as used in this report relates principally to the airfield facilities, or landing area, and includes the runway and taxiway system, the runway approach areas and the associated appurtenances such as airfield lighting, visual and navigation aids. One might argue that the aircraft parking aprons are also part of the airside operating element, however, we prefer to consider aprons as part of the "landside" because apron planning considerations are more intimately associated with passenger terminal or FBO operations which are classified in the landside element. Air traffic control facilities and meteorological considerations are also addressed in this discussion of airside facilities as they can significantly affect aircraft operations into and out of an airport. Existing airside and landside facilities are shown in Figure 3-2, Existing Airport.

Runway/Taxiway System

The Airport consists of two east-west parallel runways and encompasses 257.5 acres. The primary runway, Runway 8R/26L, is of asphalt construction and is 4,833 feet long by 75 feet wide. The true bearing of the runway is North 87° 6' 50" West. The threshold of Runway 26L is displaced 699 feet due to the location of Fairplex Drive in close proximity (approximately 350 feet) to the physical runway threshold. The entire runway length is available for takeoffs, however, the available landing length is 4,140 feet. A shorter parallel runway, Runway 8L/26R, is 3,661 feet long and 75 feet wide and is also of asphalt construction. The centerline to centerline separation of the two runways is 300 feet. This allows for simultaneous operations of only small, single engine, propeller-driven aircraft during VFR conditions as stated in FAA Order 7110.65F, Air Traffic Control. A practice helipad is located north of the runway system, near the end of Runway 26R. It is used only during VFR.

The present Airport Reference Point (ARP) is located at 34° 5'30" North latitude and 117° 46'59" West longitude. The established airport elevation, defined as the highest point along any of the Airport's runways, is 1,011 feet above mean sea level (MSL), which is found at the Runway 26R threshold.

According to the current FAA Airport Facilities Directory, the pavement strength rating for Runway 8R/26L is 26,000 pounds for single wheel landing gears. Runway 8L/26R is rated at 12,500 pounds for single wheel gears.

An evaluation of the airfield pavements was conducted for Caltrans as part of its statewide Airport Pavement Management System (APMS) in June 1988. The evaluation included a review of as-built drawings and plans of record, visual survey, and preparation of a series of reports from the pavement management system. Pavement Condition Index (PCI) condition ratings were developed for numerous pavement sections at the Airport. The runways were rated to be in excellent condition and taxiway and apron ratings ranged from good to excellent. Figure 3-3 graphically presents the PCI ratings for the airfield pavements.

Runway 8R/26L is equipped with medium intensity runway edge lights (MIRL) and each end of the runway is equipped with threshold lights which indicate the beginning of usable runway. The runway is marked with standard precision instrument markings. These include centerline, designator (runway number), threshold and fixed distance markers, touchdown zone markings and side stripes.

Runway 8L/26R is not lit and is used only during daylight VFR hours. It is marked with standard visual runway markings which include centerline stripes and runway numbers.

A segmented circle is located to the south of Runway 26L. This marking system helps visiting pilots locate wind indicators, as well as indicating nonstandard traffic patterns that may exist.

Both runways are served by a full parallel taxiway, as aircraft storage facilities are located both north and south of the runway system. The following is a description of the taxiway system:

- South Taxiway - Is the parallel taxiway for Runway 8R/26L and provides access from the runway to facilities on the south side of the Airport.

- North Taxiway - Is the parallel taxiway serving Runway 8L/26R and provides access to this runway from storage facilities in the north and northwest parts of the Airport. Additionally, this taxiway extends west, past the threshold of Runway 8L to provide direct access to the threshold of Runway 8R.

- Taxiway A - This taxiway is the entrance/exit taxiway for the Runway 26 thresholds and connects to the North and South Taxiways.

- Taxiway B - Provides access from the South Taxiway to the displaced threshold of Runway 26L.

- Taxiway C - Is an intermediate exit for both runways and also functions as a cross taxiway to/from the north and south sides. It is located approximately 1,350 feet from the physical threshold of Runway 26L.

- Taxiway D - Is an angled exit serving 26L and is located approximately 2,250 feet from the physical threshold of 26L.

- Taxiway E - Is an intermediate exit for both runways and like Taxiway C also functions as a cross taxiway. It is wider than normal taxiways - 150 feet wide. It is located roughly 3,000 feet from the physical threshold of R/W 26L.

- Taxiway F - Is an intermediate exit for Runway 8R/26L and an entrance/exit taxiway for Runway 8L/26R (located at the 8L threshold). It connects the North and South Taxiways and thus also is a cross taxiway.

- Taxiway G - Is the entrance/exit taxiway located at the threshold of Runway 8R and connects to both the north and south taxiways.

The taxiway system described above is included in Figure 3-2. The entire South Taxiway is lighted with medium intensity taxiway edge lights (MITL) and the west portion of the North Taxiway is also lit with MITL.

Meteorological Considerations

Meteorological considerations in this master plan focused on the review of 29,047 weather observations taken at Ontario International Airport over the period 1968-1978. This analysis culminated in the preparation of windroses which will be contained on the Airport Layout Plan to be prepared as part of the study.

The existing runway orientation provides 99.1 percent coverage for a 13 knot (15 mph) crosswind during all weather periods. This meets the FAA recommendation of 95 percent crosswind coverage, thus additional runways for improved crosswind coverage are not needed. FAA states in AC 150/5300-13 that the allowable crosswind is 13 knots for runways of 75 feet up to but not including 100 feet in width.

Wind speeds of 20 knots and greater occur approximately 1 percent of the time. However, the runway alignment provides full coverage for the directions of most frequent occurrences (west and westsouthwest). Calms on the other hand prevail 16.5 percent of the time. Based on the Ontario International Airport data, IFR conditions prevail 21.5 percent of the time. These are periods when cloud ceilings are less than 1,000 feet above the ground and/or visibility less than 3 miles.

Airspace And Navigational Aids

Airspace

The existing system of enroute airways, navigational aids, and airports located within a 25 nautical mile (nm) radius of Brackett Field is depicted on Figure 3-4. The several low altitude airways which traverse the area serve those enroute aircraft flying below 18,000 feet MSL. There are 15 airports within 25 nautical miles of Brackett Field which are shown on Figure 3-4 and listed in Table 3-1. Because of the very high volumes of air traffic in the Los Angeles Basin there are a number of different controlled airspace areas in the vicinity of the 25 mile area. Controlled airspace means an area in which some or all aircraft may be subject to air traffic control. The various controlled airspace areas found in the area are discussed below.

- Control Zone - Is controlled airspace which extends upward from the ground up to but not including 14,500 feet MSL. A control zone is regulatory in nature and may include one or more airports and is normally a circular area with a radius of 5 statute miles and any extensions necessary to include instrument approach and departure

Table 3-1
AIRPORTS WITHIN 25 NAUTICAL MILES
OF BRACKETT FIELD

Airport	Location from Brackett
Cable	5 nm ENE
Ontario International	9 nm ESE
Chino	10 nm SE
El Monte	13 nm W
Shepherd	15 nm WSW
Corona Municipal	15 nm SE
Riverside Municipal	19 nm SE
Fla-Bob	20 nm ESE
Rialto	20 nm E
Fullerton Municipal	22 nm SW
Los Alamitos AAF	23 nm SSW
Crystal	24 nm N
MCAS (H) Tustin	24 nm S
Long Beach	25 nm SW
MCAS El Toro	25 nm SW

Source: P&D analysis

paths. Within the area delineated by the 25 nm arc shown in Figure 3-4 there are control zones for Brackett Field, as well as Norton and March AFBs, Riverside Municipal, Chino, Ontario International, John Wayne-Orange County, Fullerton, El Monte, Long Beach Airports, MCAS(H) Tustin, MCAS El Toro and Los Alamitos AAF.

- Terminal Control Area (TCA) - A TCA consists of controlled airspace extending from the surface or higher to specified areas, within which all aircraft are subject to special operating rules and pilot and equipment requirements contained in FAR Part 91. The Los Angeles TCA is found within the 25 mile area. This is classified as a Group I TCA which is designated to the busiest airports in the country. At LAX, the TCA begins at ground level and extends up to but not including 12,500 feet. There are different parts of the TCA, each with a specific "floor" altitude. Some parts will begin at ground level, while others may begin at 2,000, 5,000 or some other altitude.

Basically, the requirements to operate within a TCA are as follows: a two-way radio capable of communicating with air traffic control facilities; a VOR or TACAN receiver (electronic navigational equipment); a transponder (a radar beacon transmitter-receiver that automatically receives and replies to signals from ATC); a private pilot certificate (i.e. no student pilots); and, a speed limit of 200 knots (230 mph).

- Airport Radar Service Area (ARSA) - Consists of controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to certain operating rules, pilot and equipment requirements contained in FAR Part 71. An ARSA will generally extend up to 20 nm from the primary airport. The basic operating rules and pilot and equipment requirements are: specific pilot certification is not required; two-way radio; for arrivals and overflights it is mandatory that two-way radio contact be established with ATC prior to entering and ARSA and maintained while with the area; for departures within an ARSA it is mandatory that two-way radio contact be maintained with ATC while within the area; operation of ultralight vehicles is prohibited unless prior authorization is received from ATC; and, parachute jumps are prohibited. The airports within the 25 mile area for which ARSAs have been established are Norton and March AFBs, Ontario International, Orange County, MCAS El Toro, and Burbank.

Brackett Field has two published instrument approach procedures - one a precision instrument approach and one a non-precision instrument approach. An instrument approach procedure is a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a point where a landing may be made visually. The procedure provides protection from obstacles that could jeopardize safety of aircraft operations by providing a specific clearance over obstacles. A precision approach procedure is one in which an electronic glideslope is provided that gives the pilot glide path, or specific descent profile guidance. A non-precision approach is a procedure in which no electronic glide slope is provided. In this case the pilot is provided with directional, or azimuth, guidance only. The tabulation below summarizes the instrument approaches and navigational aids for the Airport and shows the Navaid, location of the Navaid, type of procedure and lowest landing minima.

NAVAID	Location	Procedure	Lowest Minima
Brackett ILS	On-airport	ILS-R/W 26L	400'/1 mile
Pomona VORTAC	1 nm South	Circling	1,640'/1 mile

Plan and profile views of both approaches are presented in Figures 3-5 and 3-6. The ILS glide slope is set at a non-standard angle of 3.76 degrees to protect approaching aircraft from transitional traffic from other airports. A standard glide slope is 3 degrees. Due to the steeper approach angle, the instrument approach is restricted to Category A and B aircraft (aircraft with approach speeds less than 121 knots).

Navigational Aids

The Airport is a controlled airport in that there is an airport traffic control tower (ATCT) on the airfield. The tower is operated by the FAA and provides air traffic control services to aircraft operating at the Airport and in the vicinity of the Airport. The ATCT authorizes aircraft to takeoff and land at Brackett Field and transit the airport traffic area (typically all airspace up to 3,000 feet above airport elevation within a five mile radius). The tower operates between the hours of 7 AM and 9 PM.

The Los Angeles Air Route Traffic Control Center (ARTCC) has delegated an approach control area to the Ontario Terminal Radar Approach Control (TRACON) facility. The TRACON has responsibility for all IFR arrivals, departures and overflights within this area. Brackett Field lies within the area of responsibility of the TRACON and as such all IFR operations at Brackett are controlled by it. The function of the TRACON is basically to sequence arriving traffic transitioning from the enroute phase of flight (controlled by the ARTCC) to the airport, and vice versa. In this case, arriving aircraft will be controlled by the ARTCC, then the TRACON, then finally "handed off" to the Brackett control tower for final approach clearance and landing.

A UNICOM is maintained at the Airport. This service provides local traffic pattern advisories but is not used for air traffic control purposes. Additionally, an Automatic Terminal Information Service (ATIS) is available to pilots and provides a continuous broadcast of recorded noncontrol information in the Los Angeles area.

An inventory of the navigational aids and air traffic services available at the Airport follows:

- Airport Traffic Control Tower (ATCT) - The tower is the central operations facility in the Brackett Field air traffic control system. Air/ground communications, visual signaling and other devices are used to provide safe and expeditious movement of all air traffic. Additionally, ground movement of aircraft and vehicles on the runway/taxiway system is also under tower control.

- Instrument Landing System (ILS) - The ILS at Brackett serves Runway 26L. An ILS is an electronic ground station consisting of several components which provide a means by which a pilot can establish azimuth, elevation, and position guidance from a point away from the airport to touchdown on the runway the facility is serving. Basic to an ILS is the localizer (azimuth guidance), glide slope (elevation guidance), outer and middle markers (position guidance) and approach lights.

- Airport Surveillance Radar (ASR) - Used in the control of air traffic within a 40 to 60 mile radius of Ontario International Airport. The ASR, which is located at Ontario, scans through 360 degrees of azimuth and presents target information on radar display equipment located in the Ontario ATCT and TRACON.

- Very High Frequency Omni-Directional Range/Tactical Air Navigation (VORTAC) - This navigational aid provides azimuth (direction) and distance information to the pilot. The Pomona (POM) VORTAC is located one-half nautical mile south of the Airport and is the Navaid used for the "circling", VOR published instrument approach. It is also used for enroute navigation. The POM facility is designated as an "L" (Low Altitude) facility which means it is usable from 1,000 to 18,000 feet above the ground within 40 nautical miles of the station. Other VOR facilities in the vicinity of Brackett Field include Paradise (PDZ) VORTAC 17 nm southeast, Riverside (RAL) VOR 19 nm southeast, Seal Beach (SLI) VORTAC 23 nm southwest, and El Toro (NJZ) VORTAC 24 nm south.

- Non-Directional Radiobeacon (NDB) - The NDB transmits non-directional radio signals which allows the pilot of an aircraft to determine his bearing and "home-in" on the station. There are four NDB facilities in the Brackett Field area. El Monte (EMT) is 13 nm west, Swan Lake (LKA) is 13 nm southeast, Petis (SB) is 21 nm east, and El Toro (NJZ) is 24 nm south.

Assistance from the Flight Service Station (FSS) is available to pilots in the Brackett Field area through the Riverside FSS. This facility is located at Riverside Municipal Airport. The services which are provided by the FSS include:

- Issuance of Notices to Airmen (NOTAM's)
- Dissemination of Pilot Reports (PIREP's) to interested parties
- Issuance of weather data
- VFR advisory service
- Direction finding assistance to "lost" aircraft
- Pilot briefing service
- Flight plan assistance

In addition to the above navigational aids, ATC, and advisory services, the airport is equipped with the following visual aids. These are provided to assist pilots in locating the runway at night or during periods of reduced visibility.

- Visual Approach Slope Indicator (VASI) - provides vertical visual glide path information to approaching pilots. Runways 8R and 26L are equipped with a 2-box VASI set at a non-standard 3.8 degree glide path angle. The non-standard angle is required to provide proper obstacle clearance.

- Runway End Identifier Lights (REIL) - are two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of a runway end to approaching pilots. Both ends of the primary runway (Runway 8R/26L) are equipped with REIL.

- Rotating Beacon - a visual aid that indicates the location of an airport. Alternating white and green beams indicate an airport and the beacons are located either on or

close to an airport. The beacon for Brackett Field is located on top of a small hill southwest of the terminal/administration building and meets current FAA specifications.

LANDSIDE FACILITIES

The landside facilities consist of those airport elements which support the various activities of the airport except for the navigation and maneuvering of aircraft. The exception to this categorization is the aircraft parking apron, which due to its relation with passenger terminals and FBOs is considered a landside component. At Brackett Field the landside facilities include aircraft parking aprons, hangars, fuel facilities, auto parking and terminal buildings, airport support buildings and office and shop space. The landside facilities at the Airport are located on both the north and south sides of the field along Puddingstone Drive and the airport access road, McKinley Avenue.

Shown on Figure 3-2 are typical Building Restriction Lines (BRL) for a precision instrument runway such as 8R-26L as recommended by FAA. FAA defines the BRL as a line which identifies suitable building area locations on airports. It is observed that a number of existing structures fall within the typical BRL. Later in this report, the feasibility of enforcing a typical, or some modified, BRL will be addressed.

Terminal/Administration Building

The terminal building is located on the south side of the Airport at approximately midfield. The 8,360 square foot building was constructed in 1958 and houses airport management offices, restaurant, pilots supplies shop, public restrooms, lobby, utility room, and a pilots lounge/conference room. Additionally, approximately 2,500 SF of GA terminal use space is provided at two FBO locations, Runway 3-7 and Pomona Aero Center.

Aircraft Parking Apron

Aircraft parking is available at various locations around the Airport. There are a total of 424 paved aircraft tie-downs of which 299 are County operated and 125 operated by FBOs. Transient aircraft parking is located immediately east of the terminal building parking lot, near the fueling island. Based aircraft tie-downs are also available on the south side to the east of Pomona Aero Center, to the east of the hangar operated by Ranger Hangars, and at the easternmost part of the airfield along the South Taxiway. On the north side of the field tie-downs are available on the Runway 3-7 apron and a parking apron west of the westernmost row of hangars. Presently the tie-downs are approximately 20 percent occupied.

Aircraft Storage Hangars

There are a total of 260 aircraft storage spaces available. The County operates 170 spaces in ten rows of hangars and 18 Port-a Ports. Two FBOs also own storage hangars at Brackett

Field - Parker Aero Development and Ranger Hangars. They own a total of 72 hangar spaces. The ownership of these facilities will ultimately revert to the County in 16 to 18 years. All storage hangars are occupied and airport management reports a substantial waiting list for hangar space (176). The Pomona Police Department owns a 4,480 square foot hangar/office solely for the use of the Police Department's helicopter. There are a number of conventional, bay hangars at the airport but these are used for aircraft maintenance and not storage.

Maintenance Hangars

Aircraft maintenance and avionics servicing and sales is provided by a number of operators at the Airport. Table 3-2 summarizes the maintenance hangar and ancillary support/office space at Brackett Field.

Table 3-2
AIRCRAFT MAINTENANCE HANGARS

Operator	Hangar (SF)	Office (SF)
Brackett Acft. Radio	4,800 6,000	1,200 2,400
T.N.G Helicopters	6,400	3,200
Pomona Aero Center	8,000	3,200
Southwestern Avionics		1,600
Westair Instruments		1,406
Aerofix	5,200	

A total maintenance hangar area of 25,200 SF presently exists and will increase to 30,400 SF upon completion of the hangar to be built by Aerofix. There is also approximately 3,000 SF of shop space occupied by Southwestern Avionics and West Air Instruments.

Fuel Storage

The total bulk fuel storage capacity at Brackett Field is 30,000 gallons - 15,000 gallons of Avgas and 15,000 of Jet A. The storage tanks are five years old. Previously installed 80 octane tanks were removed due to leaking in 1988. The storage capacity is insufficient to meet existing demands at times. The fuel pumps will cease operating when the supply reaches 400 gallons and airport management has reported occurrences of this in the past. Peak sales can reach 3,000 gallons per day and the supplier requires a 9,000 gallon minimum order for deliveries.

Automobile Parking

The existing auto parking facilities total 341 spaces at various locations around the Airport. The breakdown of parking stalls is as follows:

- Terminal/Administration Building - 188 spaces
- Pomona Air Center Area - 48 spaces
- Brackett Radio Area - 73 spaces
- Runway 3-7 - 32 spaces

Additionally, aircraft owners will park their automobiles in the T-hangar area and it is reported that this sometimes poses problems with the taxiing of aircraft in taxilanes between hangars when automobiles are parked outside of T-hangar spaces. Parking space is also provided for FAA personnel at the control tower and in the Brackett Air Business Park for tenants.

Airport Support Facilities

A two-bay maintenance shop is located immediately west of the terminal/administration building and is used for airport maintenance vehicles and equipment and airport firefighting and rescue vehicles. Equipment is also parked next to the building. Fuel trucks are also parked along the fence between the terminal and maintenance buildings.

General Office Space

Office space not associated with FBO operations is available at the Airport. There is approximately 42,000 SF of existing space for light industrial/office use in the Brackett Air Business Park that is fully occupied by various aviation and non-aviation tenants.

EXISTING UTILITIES

Electric utilities are provided by Southern California Edison off 12 KV lines along Puddingstone Drive, McKinley Avenue and Fairplex Drive. The powerlines along Puddingstone to the east of Park Avenue and along Fairplex Drive are underground. The underground system along Fairplex Drive is currently being extended towards McKinley Avenue. Gas service is provided by Southern California Gas Company through a number of 2" service lines off a 8 5/8" main which runs along Park Avenue and crosses the runways and McKinley Avenue. GTE supplies telephone service through a combination of overhead and underground lines.

Water service is from the City of La Verne through a 10" main along Park Avenue which crosses the runways in the general direction of the terminal building. An 8" main off the 10" main encircles the north hangar area and another 8" main serves facilities on the south side of the field. The pressure reading at Park Avenue and Puddingstone Drive is 108 psi. A 10" main off a Fairplex Drive water line is located to the south of the southeast aircraft

parking apron and serves tenants in this part of the Airport. Los Angeles County maintains a sewer collection system serving the Airport. Sewage is collected through 8" VCP lines along and across the runways to a pump station located in the terminal area, and flows eastward through a 4" CIP force main. Newer buildings on-airport, including the administration building, are served by the Los Angeles County Sanitation District, while some buildings in the northwest rely on septic tanks. The City of La Verne wants all new facilities to be connected to a sanitary sewer. The County has made a broad commitment to resolve the sewer issue as part of the development of the northwest corner of the Airport.

AIRPORT OPERATIONS

Historical Aviation Activity

This subsection summarizes the recent historical levels of aviation activities at the Airport in terms of based aircraft, aircraft operations and fuel sales. The general aviation industry has continuously declined for about the past decade in terms of new aircraft deliveries and private pilots. The reasons for the decline are varied and include interest rates, past recession, high product liability costs, and increasing aircraft operating costs. Thus the recent trends of aviation activities at Brackett Field can be partially explained by the overall trends experienced by the GA industry.

A based aircraft is one that is permanently stationed at an airport, usually through some form of agreement between the aircraft owner and the airport management. The number of based aircraft at Brackett has increased from 459 in 1980 to 477 in 1990. This included an increase to a peak of 566 in 1983 with a steady decline to present levels. Table 3-3 presents a history of based aircraft for the period 1980-1990 and lists those aircraft hangared and tied down with the County and those based with the FBOs.

Table 3-3
HISTORY OF BASED AIRCRAFT

Year	Tiedown	Hangar	FBO	Total
1980	187	152	120	459
1981	150	152	120	422
1982	140	188	208	536
1983	145	188	233	566
1984	100	188	240	528
1985	70	188	240	498
1986	65	188	240	493
1987	65	188	240	493
1988	55	188	240	483
1989	60	188	228	476
1990	85	188	204	477

Source: Brackett Field records.

An aircraft operation, or movement, is defined as either a takeoff or landing with each operation being categorized as either local or itinerant. A local operation is one that is performed by aircraft that: 1) operate in the local traffic pattern or within sight of the airport; 2) are known to be departing for or arriving from flights in local practice areas located within a 20-mile radius of the airport; or 3) execute simulated instrument approaches or low passes at the airport. Itinerant operations are all operations other than local. Aircraft operations for the calendar years 1982-1990 are shown in Table 3-4. Based on FAA traffic counts for fiscal year 1989, Brackett Field ranked 81 out of 400 in terms of total aircraft operations for all airports with an FAA-operated airport traffic control tower. It should be noted that the operations shown in Table 3-4 are somewhat understated since they represent operations logged during the hours of tower operation (7 AM to 9 PM).

Table 3-4
ANNUAL AIRCRAFT OPERATIONS

Year	Itinerant	Local	Military	Total
1982	66,267	79,084	0	145,351
1983	75,896	88,885	0	164,781
1984	102,706	105,689	8	208,403
1985	100,726	107,031	2	207,759
1986	93,285	90,104	0	183,389
1987	94,558	115,208	12	209,778
1988	96,769	120,004	56	216,829
1989	92,056	118,585	8	210,649
1990	96,601	168,096	65	264,762

Source: Brackett Field records.

Fuel flowage refers to the number of gallons of fuel sold at Brackett Field. The fuel concession at the Airport is operated by the County. Table 3-5 presents the recent history of fuel flowage at the Airport. As previously discussed, the 80 octane storage tanks were removed in 1988 and have not been replaced.

Not separately identified in the activity statistics above is the increase the airport has experienced in helicopter activity. Brackett Field has recently become a center for helicopter operations in the Southern California region. Flight instruction and maintenance services are readily available at the Airport and the presence of the control tower and practice helipad which allows for a separate helicopter traffic pattern makes the airport an attractive location for helicopter training activities.

Table 3-5
FUEL FLOWAGE (Gallons)

Year	80 Octane	100 Octane	Jet A
1982	51,228	293,832	26,873
1983	40,917	290,078	43,285
1984	43,947	304,494	57,746
1985	47,468	305,724	94,499
1986	50,034	297,346	49,859
1987	22,386	325,705	33,634
1988	0	425,705	65,748
1989	0	437,444	94,379
1990	0	517,363	74,663

Source: Brackett Field records.

FBO Survey

The focal points of activity at general aviation airports such as Brackett are the fixed base operators (FBOs). An individual FBO may provide from one to several services to airport users including fuel, aircraft maintenance, aircraft rental and flight instruction to name but a few. At Brackett there are a number of FBOs providing a wide variety of services. Since the operators are very knowledgeable about the Airport, a survey was conducted of the major FBOs to solicit their input and comment on the type of development needed and means of improving the marketing of the Airport to attract more activity. A total of ten operators were interviewed either in person or by telephone and are listed in Appendix B. The FBOs were asked to briefly describe their existing operations and facilities, services provided, comment on major issues of the master plan, facilities believed to be required and ways to better market the Airport.

Important issues that the FBOs believed should be recognized by the master plan were the amount of activity of "gypsy" mechanics, or moonlighters, the fuel concession and poor publicity at the airport due to recent accidents. The facilities most often mentioned as required were hangars (4 responses), higher quality/central FBO (3 responses) and helicopter facilities (2 responses). Other facilities mentioned included: executive type hangar with bay, office/shop space; midfield runway exit on north side; auto parking and area lighting in the north T-hangar area; and, an on-airport road to facilitate access from one side of the airport to the other.

The FBOs also were asked to provide opinions on ways to market the airport to attract more based aircraft and users. The most frequent comments focused on aircraft fueling and hangar space. The FBOs believed that fuel prices that are more competitive with other nearby airports and improved fueling services could be provided by a private operator. The

need for additional hangar space was also noted as well as a higher quality, central FBO to provide a wide range of convenient services to transient aircraft. Other suggestions included advertising, removing the displaced threshold, and providing space for the moonlighting mechanics with the understanding that required certifications and insurance be acquired. As a result of the number of comments on fuel prices, P&D conducted a survey of FBOs that sell fuel at nine airports near Brackett. The results are presented in Table 3-6.

Aircraft Owner Survey

As part of the work program for this master plan study a survey of aircraft owners in the Brackett Field market area was included to solicit input on user preferences and facility requirements. A mailing list was obtained from the Aircraft Owners and Pilots Association (AOPA). The survey consisted of a mailout questionnaire, a copy of which is contained in Appendix C. Approximately 1,500 questionnaires were mailed. The results will be used in formulating facility requirements and will be reported in Section 5.

SURROUNDING LAND USE

The existing land uses in the vicinity of Brackett Field will be addressed in greater detail in later analyses in this master plan but are briefly described for inclusion in this inventory. The Airport is located in the southernmost portion of the City of La Verne. New office and business park uses are currently being developed to the north of the Airport near Puddingstone Drive and Fairplex Drive. Further to the west along Puddingstone, the area is generally open and in agricultural (grazing) use. Puddingstone Reservoir and Bonelli Regional Park are west and south of Brackett. The Los Angeles County Fairgrounds are immediately to the east.

Table 3-6
COMPARISON OF FUEL PRICES AT BRACKETT FIELD AND NEIGHBORING AIRPORTS
(price per gallon)

Airport	FBO	AVGAS		Jet A		Remarks
		Cash	Credit	Cash	Credit	
Brackett	**County**	**$1.75**	**$1.75**	**$1.42**	**$1.42**	
Cable	Cableair	$1.60	-	-	-	
Chino	Flight Craft	$1.45	$1.50	$1.33	$1.39	
	LICO	$1.44	$1.44	$1.15	$1.15	
Corona	Corona Air Service	$1.50	$1.50	-	-	
	Z Air	$1.50	$1.56	-	-	
Fullerton	Aviation Facilities Inc.	$1.71	$1.78	-	-	Self serve
		$1.95	$2.02	$1.39	$1.39	Truck
	General Aviation	$2.14	$2.14	-	-	Not a major seller
	Wings Aviation	$1.57	$1.67	-	-	
El Monte	County	$1.75	$1.75	$1.52	$1.52	
		$1.73	-	$1.40	-	For FBO
		$1.70	-	-	-	Bulk (200-500 gal.)
		$1.65	-	-	-	Bulk (over 500 gal.)
Ontario	Beechcraft	$2.14	-	$1.95	-	
	Wells Aviation	$1.71	$1.79	$1.39	$1.48	
	Lockheed	$1.71	$1.71	$1.39	$1.39	
Rialto	Art Scholl Aviation	$1.69	$1.69	-	-	
	Karrie Aviation	$1.60	-	-	-	
Flabob	Brown Aviation	$1.69	-	-	-	
Riverside	Hemet-Ryan	$1.85	$1.95	-	-	
	Venable	$1.85	$1.95	-	-	

Source: P&D survey of FBOs, May 1990.

Section 4
Aviation Demand Forecasts

PURPOSE AND SCOPE

Planning for the physical development of an airport necessitates the preparation of a well-documented forecast of aviation activity to be accommodated at the subject facility. Once the forecasting tasks of the planning process have been completed, the airport planner can then translate the projected activity levels into required facilities. The forecast then serves as a basis for determining the phased development of the facility components for the short, intermediate and long-range planning periods. The forecast developed for this study covers a 20-year period in 5-year increments, with the final year of the forecast period being calendar year 2010.

This report section presents the forecasts of general aviation activity for Brackett Field. General aviation (GA) is defined as all civil flying not classified as air carrier and includes a variety of activity such as personal flying, transport by corporate-owned aircraft, air taxi, and agricultural application. The GA forecast will present the basic forecast values of based aircraft and annual operations. These, plus other measures of activity developed from them, will represent the future traffic levels that must be accommodated at the Airport, and for which facilities must be provided. A discussion of demand for scheduled (commuter) air service is also included in this section.

It is important to note that the general aviation forecasts represent unconstrained potential or "market-driven" demand, without consideration of the physical, safety, noise, regulatory, institutional, or political constraints that may preclude development of facilities to fully serve the demand.

The scope of the analyses included projections of:

- Total based general aviation aircraft
- The fleet mix of based aircraft (single engine piston, multi-engine piston, turboprop, business jet, and rotorcraft)
- Total annual aircraft operations, by type of aircraft (single engine piston, multi-engine piston, etc.), by type of operation (local versus itinerant), and by peak hour
- Annual fuel flowage
- Scheduled air service

It is important to note that due to the uncertainties in the long-range aviation outlook, long-term forecasting is approximate in nature. However, an indication of trends is important since estimates can be made of facility costs, social costs and environmental impacts which an airport creates on the surrounding area. Thus, the purpose of the forecasting effort is to identify activity levels which then serve as planning tools.

SUMMARY OF FINDINGS

- Assuming there are no physical, safety, regulatory, institutional, or political constraints which might preclude the development of facilities to fully serve potential demand, the number of general aviation aircraft based at Brackett Field is expected to reach 622 by 2010, an increase of 130 aircraft (26 percent) over 1990 levels.

- Potential aircraft operations are projected to increase from 265,000 in 1990 to 357,150 operations by 2010, an average of 1.7 percent annually. The projected increase is largely influenced by helicopter traffic and the recent trends of increased activity at the Airport.

- Total aircraft operations during the peak hour of the average day of the peak month should amount to 92 operations by 2010, an increase of 71 operations (30 percent) over 1990 levels.

- Sales of 100 octane fuel are expected to increase from 517,400 gallons in 1990 to 697,900 gallons by 2010. This represents an increase of 35 percent. Jet fuel sales are projected to total 100,700 gallons per annum by 2010.

MAJOR ASSUMPTIONS

Market Area

Brackett Field's primary market is defined as the area in which the majority of the owners (persons or companies) of aircraft based at the Airport are located. This area, shown in Figure 4-1, covers the Covina and Pomona population subregions and includes 65 percent of the owners of aircraft based at the Airport. An additional 17 percent of owners with aircraft based at Brackett Field are located in 2 population subregions to the east (Ontario) and west (Pasadena) of the primary market area. These 2 subregions are defined as the Airport's secondary market area. Another 16 percent of based aircraft owners are distributed throughout the remaining 51 population subregions in the Southern California region; the remaining 2 percent of owners with aircraft based at Brackett Field are located outside the Southern California region.

Competitive Airports

Competitive airports are defined as facilities which have a significant number of their based aircraft owners located in Brackett Field's primary or secondary market area. These airports are shown in Figure 4-2 and include Chino, Cable, El Monte, and Rialto. The types of aviation facilities offered at each airport are shown in Table 4-1. It is assumed that the competitive relationships between Brackett Field and these competitive airports will remain constant over the forecast period, that is, improvements at one airport will be matched by improvements at the other airports.

Table 4-1
AVIATION FACILITIES AT BRACKETT FIELD
AND COMPETITIVE AIRPORTS

AVIATION FACILITIES	AIRPORT				
	Brackett	Chino	Cable	El Monte	Rialto
Published Instrument Approach	ILS	ILS	VOR	VOR	NDB
Control Tower	YES	YES	NO	YES	NO
VASI	YES	YES	YES	YES	YES
Runway Length (feet)	4,839	6,222	3,785	3,995	2,644

Sources: California Department of Transportation; Pilots Guide to California Airports; P&D Technologies.

Potential Demand

For purposes of this forecasting analysis, it is assumed there are no physical, safety, regulatory, institutional, or political constraints at Brackett Field or other airports in the region which might preclude the airport from developing facilities to fully serve the potential demand. These assumptions allow the full "market driven" demand to be estimated. This unconstrained demand will be used to determine facility requirements in subsequent steps of the master planning process.

FORECAST OF BASED AIRCRAFT

A based aircraft is one that is permanently stationed at an airport, usually by some form of agreement between the aircraft owner and airport management. This forecast value is used in developing projections of aircraft activity, as well as determining facility requirements for airport elements such as aprons and hangars.

Multiple linear regression techniques were used to forecast based aircraft demand and as found in this and other P&D studies, population is the primary variable that has the highest degree of correlation with aviation demand. Moreover, all other things being equal, distance from the airport is a key variable relating to the distribution of this demand. Thus, the regression analysis related potential demand for based aircraft to the size of clusters of potential user populations and the distance of these population concentrations to the airport.

The forecast model evaluated this size/distance relationship for 55 subregions within Southern California. In addition, the range of aviation-related facilities (i.e., control tower, runway length, visual aids, and availability of precision or non-precision instrument approaches) offered by an airport relative to other competitive facilities will also affect the decision to locate at a general aviation airport and act to modify the distance variable. Therefore, the forecast model evaluated and included this relationship between Brackett Field and four competitive airports[1]. The principal advantages of this method for forecasting based aircraft are that the approach accounts for future increases in the pool of potential airport users, as well as the distribution of these users; and, it incorporates competitive differences between the airports.

Initial model calibration was accomplished using based aircraft ownership distribution and airport facilities data obtained from the California Department of Transportation, Division of Aeronautics, existing and future population data from the Southern California Association of Governments, and distance data (as measured by estimated driving time) developed by P&D Technologies.

Total based aircraft were initially determined for each type of aircraft using the projected

[1]Competitive airports include Chino, Cable, Rialto, and El Monte.

fleet mix for Brackett Field developed for the California Aviation System Plan[2]. The final fleet mix forecast was increased for business jets and rotorcraft to reflect current trends.

The potential number of general aviation aircraft based at Brackett Field is expected to reach 622 by 2010, an increase of 130 based aircraft over 1990 levels. As seen in Table 4-2, single engine piston aircraft should account for the majority of demand, or 543 aircraft by 2010. Multi-engine piston aircraft should account for another 40 aircraft, turboprop aircraft for 7, and business jets for 9. As noted in Section 3, Brackett Field has recently become a center for helicopter operations in the Southern California region. This trend is evidenced by the increase in based rotorcraft to 11 in 1990 from 4 in 1987. This growth in demand is expected to continue, with a potential demand of 23 based helicopters by 2010.

Table 4-2
PROJECTED BASED AIRCRAFT

Aircraft Type	1990	1995	2000	2005	2010
Single Engine Piston	443	468	494	518	543
Multi Engine Piston	29	31	34	37	40
Turboprop	3	4	4	6	7
Business Jet	6	6	7	8	9
Rotorcraft	11	14	16	20	23
Total	**492**	**523**	**555**	**589**	**622**

Notes:
1. 1990 based aircraft per FAA Airport Master Record, 2/8/90, except for rotorcraft. Rotorcraft data provided by Brackett Field administration and FBOs.
2. Based aircraft do not include 16 helicopters and 2 fixed-wing aircraft that would be operated by the Sheriff's Department Aero Bureau.

Source: P&D Technologies

FORECAST OF AIRCRAFT OPERATIONS

Annual Operations By Aircraft Type

An operation, or movement, is defined as either a takeoff or landing. Total annual aircraft operations and operations by type of aircraft were projected by first using ratios of operations per based aircraft for Brackett Field extracted from the California Aviation System Plan. These ratios were then applied to the projections of based aircraft developed above. Again, these ratios were modified for business jets to reflect current trends. Finally,

[2]California Department of Transportation, Division of Aeronautics, The California Aviation System Plan, Element II: Forecasts, Volume 2, Appendices, August 1988.

the operations forecasts include aircraft movements occurring while the control tower is open. Therefore, civil aircraft operations were increased by 5 percent to account for aircraft operations occurring during periods when the tower does not operate[3].

Annual aircraft operations are projected to increase by an average of 1.7 percent annually, reaching 357,150 operations by 2010 (see Table 4-3). The majority of these operations should be by single engine piston aircraft, accounting for 216,800 operations by 2010, or 61 percent of all operations. Helicopter operations should reach 83,100 by 2010, followed by multi-engine piston (43,200), turboprop operations (9,900), business jet operations (4,000), and military operations (150).

Local operations are expected to account for the majority of aircraft operations at Brackett Field, reaching 210,500 by 2010, or 59 percent of total operations, by 2010. Itinerant operations are projected to reach 146,600 per annum by 2010.

Peak Hour Operations

Peak hour operations forecasts were developed using historic monthly, daily and hourly airport traffic data obtained from the Brackett Field control tower. Based upon 1989 data, it is estimated that total aircraft operations during the peak hour of the average day of the peak month (ADPM) would amount to 92 operations by 2010 (see Table 4-4).

FUEL FLOWAGE FORECAST

Fuel flowage was projected using historic ratios of fuel flowage to annual operations. As noted in Table 4-5, sales of 100 octane fuel is expected to increase by 29 percent between 1990 and 2010, from 412,200 gallons in 1990 to 532,400 gallons by 2010. Jet fuel sales are projected to increase from 67,000 gallons in 1990 to 86,600 gallons per annum by 2010.

COMPARISON WITH OTHER FORECASTS

The California Department of Aeronautics (DOA)[4] and the Southern California Association of Governments (SCAG)[5] have prepared forecasts of both based aircraft and aircraft operations for Brackett Field. In addition, the FAA[6] has prepared annual operations forecasts for Brackett Field. These forecasts are compared with P&D Technologies projections contained in this report in Table 4-6. As Figure 4-3 shows, P&D's based aircraft

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[3]This percentage was provided by the FAA Air Traffic Manager, Brackett Field ATCT.

[4]California Department of Transportation, Division of Aeronautics, The California Aviation System Plan, Element II: Forecasts, August 1988.

[5]Southern California Association of Governments, General Aviation Systems Study, Phase II, December 1987.

[6]Federal Aviation Administration, Terminal Area Forecasts, FY 1991-2005, July 1991.

Table 4-3
PROJECTED AIRCRAFT OPERATIONS
BRACKETT FIELD: 1987-2010

Type of Aircraft/Operation	Year 1987	1990	1995	2000	2005	2010
Military						
Local	5	5	5	5	5	5
Itinerant	144	145	145	145	145	145
Total	149	150	150	150	150	150
Single Engine Piston						
Local	108,630	106,900	113,000	119,400	125,800	132,200
Itinerant	69,556	68,400	72,400	76,400	80,600	84,600
Total	178,186	175,300	185,400	195,800	206,400	216,800
Multi Engine Piston						
Local	7,293	7,400	8,000	8,700	9,400	10,100
Itinerant	23,903	24,300	26,100	28,300	30,800	33,100
Total	31,197	31,700	34,100	37,000	40,200	43,200
Turboprop						
Local	539	600	800	900	1,100	1,300
Itinerant	3,547	4,100	5,200	6,200	7,400	8,600
Total	4,086	4,700	6,000	7,100	8,500	9,900
Business Jet						
Local	0	100	200	300	300	400
Itinerant	0	1,400	1,900	2,400	3,000	3,600
Total	0	1,500	2,100	2,700	3,300	4,000
Rotorcraft						
Local	3,114	41,100	48,600	52,300	59,000	66,500
Itinerant	1,829	10,300	12,100	13,100	14,800	16,600
Total	4,943	51,400	60,700	65,400	73,800	83,100
TOTAL OPERATIONS						
Local	119,581	156,105	170,605	181,605	195,605	210,505
Itinerant	98,979	108,645	117,845	126,545	136,745	146,645
Total	218,561	264,750	288,450	308,150	332,350	357,150

Note: Does not include approximately 11,000 annual operations, primarily rotorcraft, generated by the Sheriff Department Aero Bureau's proposed project.

Source: P&D Technologies

Table 4-4
PEAK HOUR OPERATIONS FORECAST

Hour	1990	1995	2000	2005	2010
0700	13	14	15	16	17
0800	35	37	40	42	45
0900	68	73	78	83	88
1000	67	71	76	81	86
1100	69	73	78	83	89
1200	63	68	72	77	82
1300	61	66	70	75	79
1400	68	72	77	82	87
1500 (Peak)	**71**	**76**	**81**	**86**	**92**
1600	61	66	70	75	79
1700	36	38	41	44	46
1800	20	21	23	24	26
1900	11	12	13	14	15
2000	8	9	10	10	11

Source: P&D Technologies

Table 4-5
PROJECTED FUEL FLOWAGE
(Gallons)

Year	100 Octane	Jet A
1990	517,363	74,663
1995	563,700	81,300
2000	602,200	86,900
2005	649,500	93,700
2010	697,900	100,700

Source: P&D Technologies

Table 4-6
COMPARISON OF AVIATION FORECASTS
BRACKETT FIELD

	1995	2000	2005	2010
Based Aircraft				
P&D Technologies	523	555	589	622
CASP [1]	510	521	533	NA
SCAG [3]	NA	NA	507	NA
Annual Operations				
P&D Technologies	288,450	308,150	332,350	357,150
CASP	218,072	223,858	230,234	NA
FAA [2]	285,000	291,000	297,000	NA
SCAG [3]	NA	NA	241,333	NA

[1] California Aviation System Plan, Element II: Forecasts, August, 1988.
[2] Terminal Area Forecasts, FY 1991-2005, July, 1991.
[3] General Aviation Systems Study-Phase II, December, 1987.

Sources: Caltrans, Division of Aeronautics; Federal Aviation Administration; SCAG; P&D Technologies.

forecasts for the year 2005 are higher than both the California DOA and SCAG projections (by 10 percent and 16 percent, respectively).

Similarly, P&D's operations forecasts are higher than the FAA, DOA and SCAG projections (see Figure 4-4). It is important to note that the P&D forecast of aircraft operations are largely influenced by helicopter activity and reflect the recent proliferation of rotorcraft traffic at the Airport.

Finally, it may be noted that SCAG forecasts no growth in based aircraft for Brackett Field over the next 15 years. This forecast seems improbable given the population growth in the area. Moreover, the CASP projections were based upon earlier SCAG population forecasts which are lower than current SCAG population estimates which were the basis for P&D projections. Therefore, the P&D projections are considered more reliable for master planning purposes.

POTENTIAL FOR SCHEDULED AIR SERVICE

This section investigates the potential for scheduled air service at the Airport. The type of service considered in this analysis is provided by regional airlines, or as they have been traditionally called "commuters". The term commuter refers to regional airlines that usually operate smaller, turboprop aircraft seating from 15 to 60 passengers. Because of their size and performance characteristics, commuter aircraft operate on short haul (an average of approximately 150 miles), low density routes. The commuters often act as feeders to larger hub airports as they bring passengers from outlying, low density markets to connect to flights to their ultimate destinations. The connecting flights can be on either a major air carrier or another commuter flight.

Scheduled air service is available in close proximity to Brackett Field at Ontario International Airport (ONT) which is nine miles away. In 1988, ONT enplaned nearly 2.4 million passengers, with commuter enplanements totalling 18,400 (less than one percent).[7]

The present commuter service at ONT is essentially provided by two carriers, Sky West and Westair, who are affiliated with major airlines under code-sharing agreements. Sky West is affiliated with Delta and Westair with United. Based on published airline schedules there are 24 daily commuter departures on weekdays with a total of 443 available seats.[8] The commuter flights are to LAX, Fresno and Palm Springs. The breakdown of flights and seats by destination are:

[7]Secretary's Task Force on Competition in the U.S. Domestic Airline Industry. U.S. Department of Transportation. February 1990.

[8]Official Airline Guide, August 1, 1990.

- 58 percent to LAX
- 30 percent to Fresno
- 12 percent to Palm Springs

The aircraft types used to serve the routes are Swearingen Metroliners and British Aerospace Jetstreams, which are 19 seat, turboprop aircraft.

In consideration of the data reviewed it does not appear likely that a scheduled air service operation could be sustained at Brackett Field. This is due to:

- Superior overall air service available at Ontario
- The low number of annual commuter enplanements at Ontario of which only a small portion could be expected to divert to service at Brackett Field
- The small number of destinations presently served by commuters at Ontario

While commuter demand is generated in the Brackett Field area it is not judged sufficient to support a scheduled service operation. It is believed that more responsive air service needs of the community can be provided on a charter basis through air taxi service by FBOs.

Section 5
Facility Requirements

INTRODUCTION

Section 4 produced a forecast of traffic volumes expected to be generated at the airport during the 20-year forecast period. The next step in the master planning process is to determine the type and magnitude of airport facilities that will be needed during the 20-year period to satisfactorily accommodate future traffic volumes.

The process of determining facility requirements involves the application of acceptable airport planning standards to the various forecast components to identify the needed facilities that will provide sufficient capacity to handle the expected traffic. By comparing the sizes and capacities of the future facility needs with existing facility sizes and capacities, facility deficiencies can be determined and quantified.

The deficiencies are then resolved by increasing facility capacities staged over a three-phase development program. This section of the report will deal with the calculation of theoretical airport facility requirements as discussed above. The facilities developed through this planning process must be considered theoretical at this time because they have not been related to existing facilities. In Section 7, Airport Plans, the facility requirements will be delineated in a series of plans and drawings. During this process, adjustments to the facility requirements may be necessary and the resulting facilities become the basis of the recommended development program.

Airport facility requirements are grouped into the two main operating elements - the airside facilities and the landside facilities. Before addressing the facility requirements, a brief discussion of airport classification is presented.

AIRPORT CLASSIFICATION

Brackett Field functions in several roles as defined by FAA and explained in Section 3. First, it is a general aviation airport which means it enplanes less than 2,500 annual passengers and is used exclusively by private and business aircraft that do not provide common-carrier passenger service. Brackett Field is contained in the National Plan of Integrated Airport Systems (NPIAS) and is classified as a general utility (GU) airport. This class airport is designed to serve all airplanes classified by FAA as Aircraft Approach Category A and B. The Airport has also been designated as a Reliever by FAA.

The FAA in its current AC 150/5300-13, Airport Design, has developed an airport reference code (ARC) which is a coding system that relates airport design criteria and planning standards to two components: the operational and physical characteristics of aircraft operating at or expected to operate at the airport. It is an alphanumeric code with the numeric component consisting of a Roman numeral. The letter element of the code is the aircraft approach category and thus relates to operational characteristics. The aircraft approach category is a grouping of aircraft that is based on 1.3 times the stalling speed as follows:

Category	Speed
A	Speed less than 91 knots
B	Speed 91 knots or more but less than 121 knots
C	Speed 121 knots or more but less than 141 knots
D	Speed 141 knots or more but less than 166 knots
E	Speed 166 knots or more

The second component of the ARC is the airplane design group and relates to the wingspan of aircraft and therefore is a physical characteristic. The grouping of aircraft by wingspan (Aircraft Design Group) is as follows:

Airplane Design Group	Wingspan
I	Up to but not including 49 feet
II	49 feet up to but not including 79 feet
III	79 feet up to but not including 118 feet
IV	118 feet up to but not including 171 feet
V	171 feet up to but not including 214 feet
VI	214 feet up to but not including 262 feet

The aircraft approach speed element of the ARC will generally deal with runways and runway related facilities whereas the wingspan (and relevant Airplane Design Group) relates to separations required between airfield elements, i.e., runway-taxiway separations, taxilane and apron clearances, etc.

For this master plan study the airport is designated as code B-II which is appropriate for an airport serving larger general aviation aircraft. Since the Airport has a short parallel runway that handles small single-engine aircraft it should be noted that some elements of the airport may be designed based upon a less demanding ARC. In some cases, such as for Runway 8L-26R, design criteria keyed to Airplane Design Group I may be warranted and applied.

Planning standards contained in FAA AC 150/5300-13, Airport Design, will be applied in this study of Brackett Field based on standards for an Airport Reference Code of B-II. As previously stated, this will accommodate larger GA aircraft. It is recognized that aircraft larger than Airplane Design Group II could conceivably use the airport on occasion. The application of planning standards to accommodate such infrequent, or special use, by larger aircraft would result in an over-design of facilities which is not warranted by the airport. As also stated earlier, airport design standards for smaller aircraft may be applied on a case by case basis depending on the situation. The rationale for such an application will be documented where appropriate in the master plan report.

Tables 5-1 and 5-2 present the relevant airport planning standards to be used in this study. Table 5-1 contains separation criteria for runways and taxiways. Since the airport currently

Table 5-1
RUNWAY AND TAXIWAY SEPARATIONS FOR AIRPORT REFERENCE CODE B-II
(feet)

Description	Precision Inst. Runway	Visual Runway
Runway Centerline to:		
Hold Line	250	200
Taxiway/Taxilane Centerline	300	240
Aircraft Parking Area	400	250
Building Restriction Line	750	250
Helicopter Touchdown Pad	400	400
Taxiway Centerline to:		
Parallel Taxiway/Taxilane Centerline	105	105
Fixed or Movable Object	65	65
Taxilane Centerline to:		
Parallel Taxilane Centerline	97	97
Fixed or Movable Object	57	57

Table 5-2
AIRPORT PLANNING STANDARDS FOR AIRPORT REFERENCE CODE B-II

Description	Precision Inst. Runway	Visual Runway
Runway Width	100	75
Runway Shoulder Width	10	10
Runway Blast Pad Width	120	95
Runway Blast Pad Length	150	150
Runway Safety Area Width	300	150
Extended Runway Safety Area Length [1]	600	300
Runway Object Free Area Width	800	500
Runway Object Free Area Length [1]	1,000	600
Taxiway Width	35	35
Taxiway Edge Safety Margin	7.5	7.5
Taxiway Shoulder Width	10	10
Taxiway Safety Area Width	79	79
Taxiway Object Free Area Width	131	131
Taxilane Object Free Area Width	115	115

[1] Length begins at end of each runway.

Sources: FAA Advisory Circular 150/5300-13, Airport Design.

has an instrument approach procedure, separation standards for both precision and non-precision instrument runways are included. Table 5-2 provides the runway and taxiway dimensional design criteria for a B-II ARC.

AIRFIELD CAPACITY REQUIREMENTS

Hourly runway capacities and annual service volume (ASV) estimates are needed to design and evaluate airfield development and improvement projects. The method for computing airport capacity is the throughput method described in FAA AC 150/5060-5, Airport Capacity and Delay.

Definition of Terms

The terms used in analyzing airport capacity are defined below:

Aircraft Mix - is the relative percentage of operations conducted by each of four classes of aircraft according to size (A, B, C and D). Table 5-3 identifies the physical characteristics of the four aircraft size classifications and their relationship to terms used in the wake turbulence standards.

Table 5-3
AIRCRAFT CLASSIFICATIONS

Aircraft Class	Max. Cert. T.O. Weight (lbs.)	Number of Engines	Wake Turbulence Classification
A	12,500 or less	Single	Small (S)
B		Multi	
C	12,500 - 300,000	Multi	Large (L)
D	Over 300,000	Multi	Heavy (H)

Source: FAA AC150/5060-5, Airport Capacity and Delay.

Annual Service Volume (ASV) - is a reasonable estimate of an airport's annual capacity. It accounts for differences in runway use, aircraft mix, weather conditions, etc., that would be encountered over a year's time.

Capacity - (throughput capacity) is a measure of the maximum number of aircraft operations (takeoffs and landings) which can be accommodated on the airport or airport component

in an hour. Since the capacity of an airport component is independent of the capacity of other components, it can be calculated separately.

Ceiling and Visibility - for purposes of capacity calculations, the following terms are used as measures of ceiling and visibility conditions:

VFR - Visual flight rule conditions occur whenever the cloud ceiling is at least 1,000 feet above ground level and the visibility is at least three statute miles.

IFR - Instrument flight rule conditions occur whenever the cloud ceiling is at least 500 feet but less than three statute miles.

PVC - Poor visibility and ceiling conditions exist whenever the cloud ceiling is less than 500 feet and/or the visibility is less than one statute mile.

Delay - is the difference between constrained and unconstrained operating time.

Demand - is the magnitude of aircraft operations to be accommodated in a specified time period.

Mix Index - is a mathematical expression. It is the percent of Class C aircraft plus three times the percent of Class D aircraft, and is written % (C+3D).

Percent Arrivals (PA) - is the ratio of arrivals to total operations and is computed as follows:

$$PA = \frac{A + 1/2\,(T\&G)}{A + DA + (T\&G)} \times 100$$ where:

A = number of arriving aircraft in the hour

DA = number of departing aircraft in the hour

T&G = number of touch and go's in the hour

Percent Touch and Go's (T&G) - is the ratio of landings with an immediate take-off to total operations and is computed as follows:

$$T\&G = \frac{(T\&G)}{A+DA+(T\&G)} \times 100$$ where:

A = number of arriving aircraft in the hour

DA = number of departing aircraft in the hour

T&G = number of touch and go's in the hour

Touch and go operations are normally associated with training. The number of these operations usually decrease as the number of air carrier operations increase, as demand for service approaches runway capacity, or as weather conditions deteriorate.

Runway Use Configuration - is the number, location and orientation of the active runway(s), the type and direction of operations, and the flight rules in effect at a particular time.

Having established the definitions of terms used in the capacity analysis, the balance of this subsection deals with the calculation of runway hourly capacities and the annual service volume.

Runway Hourly Capacity

Runway hourly capacity is calculated for the different configurations under which the Airport will operate. For Brackett Field these are:

- VFR-Days - when operations are conducted simultaneously on both runways.
- VFR-Nights - when operations are restricted to the lighted runway (8R-26L).
- IFR-Days and Nights - when operations are restricted to Runway 8R-26L.
- Airport closed - those periods when weather conditions are below published landing minimums.

The hourly capacity estimates were carried out in accordance with instructions and capacity curves set forth in FAA AC 150/5060-5, Chapter 3. The basic steps followed were:

1. From Figure 3-1 of the AC, the appropriate graphs for determining VFR and IFR hourly capacity are identified.

2. Use Figure 3-9 for VFR-Days capacity, Figure 3-3 for VFR-Nights, and Figure 3-43 for IFR capacity.

3. Mix Index % (C+3D) = (1+3[0]) = 1%. (Based on forecast fleet mix).

4. Percent Arrivals - 50%. (Arrivals are assumed to equal departures).

5. From Figure 3-9 Hourly VFR-Days Base Capacity - 200 operations.
   From Figure 3-3 Hourly VFR-Nights Base Capacity - 100 operations.
   From Figure 3-43 Hourly IFR Base Capacity - 62 operations.

6. Touch-and-go operations are estimated at 30% of total operations. This translates into a touch-and-go factor of 1.20 during VFR.

7. Since two and three runway exits (turnoffs) exist for the exit range determined by FAA (2,000-4,000 feet) an exit factor of 0.94 is obtained from Figures 3-9 and 3-3

(for VFR conditions). An exit factor of 1.00 is obtained from Figure 3-43 for IFR conditions.

8. VFR-Days Hourly Capacity = 200*1.20*0.94 = *226 Operations.*
VFR-Nights Hourly Capacity = 100*1.20*0.94 = *113 Operations.*
IFR Hourly Capacity = 62*1.00*1.00 = *62 Operations.*

For the purposes of capacity estimates, the hourly capacity is assumed to be the same for both operating directions (east and west, or Runway 8 or 26). The above capacities were calculated for west flows of traffic which occur over 95 percent of the time. It should be noted that the above capacities represent the traffic handling ability of the two runways at Brackett and do not include the capacity enhancements provided by the practice helicopter pad near the threshold of Runway 8L or other air traffic procedures in effect at the Airport that are designed to expedite the flow of helicopter traffic. These facilities and procedures allow more of the runway capacity to be utilized by fixed-wing aircraft. It is estimated that the practice pad allows for an additional 50 operations per hour to the capacities described above.

Annual Service Volume (ASV)

The hourly capacities determined in the preceding steps together with the percent of operating conditions are used to calculate a weighted hourly capacity (Cw). For the estimate of ASV is was assumed that the airport was closed 4 percent of the time due to IFR conditions below the published minimums for the ILS approach for Runway 26L (a ceiling of 320 feet AGL and visibility of 1 mile). Based on 29,047 weather observations (ceiling and visibility) taken at Ontario International Airport between 1968-1978 compiled by the National Climatic Data Center and used for Brackett Field, the breakdown of flying weather is:

VFR - 78.5%
IFR - 21.5% (4% of which is below minimums)

Based on the above and procedures contained in the AC a weighted hourly capacity of 120 operations is obtained for the Airport and is used for estimating ASV.

Annual service volume is calculated as:

$$ASV = (Cw)*(D)*(H)$$

where:

Cw = weighted hourly capacity
D = ratio of annual to average day of the peak month (ADPM) demand
H = ratio of ADPM to peak hour demand

Demand ratios were developed from historical data obtained from the ATCT and used in the projection of peak hour forecasts. The ratios derived were a daily demand ratio (D) of 320 and an hourly ratio (H) of 9. These were then compared for reasonableness with typical demand ratios provided in the AC. The derived daily ratio proved to be slightly higher than the range of 280-310 contained in the AC and the hourly ratio represented a midpoint value for the suggested range of 7-11. Due to the reliability of the historical traffic data (actual tower logs), the daily and hourly ratios derived were judged valid for this analysis.

The ASV is then calculated at 346,500 operations. This was also checked against long range planning ASV estimates contained in AC 150/5060-5 for the airport configuration and fleet mix and showed a good correlation. The long range estimate provided in the AC is 355,000 operations.

It should be noted that the above calculated ASV represents the capacity of the present airport. It is also important to note the capacity of an airport is not constant and may vary over time depending upon airfield improvements, airfield or airspace geometry, ATC procedures, weather and mix of aircraft operating at the airport. The capacity of an airport can change with or without airfield improvements.

Demand Versus Capacity

By comparing ASV and hourly capacities with the forecast annual and peak hour demand, the relationship between demand and capacity can be determined. Table 5-4 presents the comparisons of demand versus capacity and as seen it appears that the present airfield will reach capacity near the end of the planning period.

Table 5-4
DEMAND VERSUS CAPACITY

	1995	2000	2010
ANNUAL:			
Demand	288,450	308,150	357,150
Capacity	346,500	346,500	346,500
% Capacity Utilized	83	89	103
WEIGHTED HOURLY:			
Demand	76	81	92
Capacity	120	120	120
% Capacity Utilized	63	68	77
VFR:			
Demand	76	81	92
Capacity	226	226	226
% Capacity Utilized	34	36	41

In the year 2010, annual demand exceeds the present capacity. However, it is important to note the composition of demand (operations) which is significantly influenced by helicopters. Helicopter operations are forecast to account for almost 25 percent of total operations in the year 2010. Considering that most of these operations would not occur on the runway suggests that there is adequate runway capacity to accommodate demand. Hourly demand is 77% of the weighted hourly capacity in 2010 and during VFR conditions in daylight hours, hourly demand is only 41% of the hourly capacity. This latter relationship between demand and capacity is well below activity levels recommended by FAA when capacity improvements should be considered, and will be used as the main capacity measure since the majority of aircraft operations are conducted during VFR, daylight conditions. Generally, capacity improvements should be recommended when demand is forecast to utilize 60 percent of capacity. This allows sufficient lead time to develop the improvement before the airport becomes saturated which would cause intolerable delays. Airport activity levels warranting capacity improvements are contained in FAA Order 5090.3A. As seen in Table 5-4, the forecast demand utilizes more than 60 percent of annual and weighted hourly capacity throughout the 20-year planning period. During daytime, VFR conditions however, the peak hour demand utilizes from 34 to 41 percent throughout the planning period.

From the preceding demand/capacity analysis it is concluded that airfield (runway/ taxiway) improvements are not warranted based upon capacity reasons. Although the implementation of additional airfield capacity is not warranted strictly from a capacity standpoint, there may be equally important considerations that dictate otherwise.

AIRSIDE FACILITY REQUIREMENTS

As discussed earlier, the airside operating element as used in this report includes the runway and taxiway system, the runway approach areas and the associated appurtenances such as airfield lighting, visual aids and navigation aids. With the exception of aircraft aprons which, due to their interface with terminal facilities, are analyzed as a landside element, airside refers to those airport areas where aircraft operations are conducted. The ability of the present airside facilities to accommodate existing and future traffic loads and the facilities required through the year 2010 are examined in the following subsections.

Runway System

The existing runway system was described in Section 3. This section will deal with runway requirements needed to satisfy the forecast demand in terms of runway length, pavement strength requirement, crosswind coverage and safety areas. Planning and design standards set forth in FAA AC 150/5300-13, Airport Design, for Airport Reference Code B-II form the basis of this analysis. This will provide satisfactory facilities for the general aviation aircraft expected to use the Airport.

Crosswind Runway

The present runway orientation (8-26) provides 99.1 percent coverage for a 13 knot (15 mph) crosswind during all weather periods. This meets the FAA recommendations of 95 percent crosswind coverage, thus additional runways for improved crosswind coverage are not needed.

Runway Length

This subsection deals with the runway length requirements for the existing runways at Brackett. It is noted that since Runway 8L-26R accommodates smaller aircraft than those on the main runway, different design criteria are applied.

Runway length is a critical consideration in airport planning and design. Aircraft need specified runway lengths to operate safely under varying conditions of wind, temperature and takeoff weight. This is particularly critical for jet aircraft where inadequate runway length will reduce the allowable takeoff weight. The weight reduction must come through either less payload or less fuel, thereby restricting the usability or operational range.

Former FAA Advisory Circular 150/5325-4A contains criteria used in developing runway lengths required for various general aviation utility airports. The recommended runway lengths are based on performance information from manufacturer's flight manuals in accordance with provisions in FAR (Federal Aviation Regulations) Part 23, Airworthiness Standards: Normal, Utility and Acrobatic Category Airplanes, and FAR 91, General Operating and Flight Rules.

Aircraft performance together with significant site characteristics are considered in analyzing runway length. The site characteristics that are evaluated include: airport elevation, temperature (mean maximum temperature of the hottest month) and wind conditions. The airport site characteristics used in the runway length analysis were:

Elevation - 1,011 feet MSL
Temperature - 92°F
Surface Winds - Calm

The Advisory Circular contains a series of runway length curves for runways expected to serve small aircraft. Table 5-5 lists the representative aircraft models that can be accommodated by the runway length determined by this method. The runway length curves for the most demanding aircraft, i.e., aircraft having a seating configuration of ten or more passengers, were used. Use of this technique concluded that a length of 4,500 feet is required to accommodate the larger aircraft shown in Table 5-5. Since the Airport has a parallel runway for use by small aircraft the same approach was used to confirm runway length requirements for Runway 8L-26R. However, the runway length curve that is

Table 5-5
REPRESENTATIVE AIRCRAFT MODELS INCLUDED IN RUNWAY LENGTH ANALYSIS

Beech	B19 Sport/150
Beech	B24R Sierra/200
Beech	F33A Bonanza
Beech	V35B Bonanza
Beech	A36 Bonanza
Beech	C23 Sundowner
Beech	B55 Baron
Beech	B58P Baron
Beech	B60 Duke
Beech	B80 Queen Air
Beech	E90 King Air
Beech	B99 Airliner
Beech	A100 King Air
Bellanca	Citabria Series
Bellanca	8GCBC Scout
Bellanca	300A Super Viking
Britten-Norman	Mark III-I Trilander
Cessna	150 Series
Cessna	172 Skyhawk
Cessna	182 Skylane
Cessna	T206 Stationair
Cessna	204 Skywagon
Cessna	337 Skymaster
Cessna	P337 Skymaster
Cessna	310
Cessna	340A
Cessna	402B Businessliner
Grumman American	AA-1B Trainer
Grumman American	A A - 5 A Cheetah
Grumman American	AA-5B Tiger
Mitsubishi	MU-2L
Mooney	M20C Ranger
Mooney	M20E Chaparral
Mooney	M20F Executive
Navion	Rangemaster H
Piper	PA-11 thru PA-22 Series
Piper	PA-28 Series
Piper	PA-32-300 Cherokee Six
Piper	PA-32-300R Lance
Piper	PA-32-260 Cherokee Six
Piper	PA-23-250 Aztec
Piper	PA-34-200 Seneca II
Piper	PA-24 Series
Piper	PA-30-150 Twin Commanche
Piper	PA-31-350 Chieftain
Piper	PA-31-425 Navajo
Rockwell Int'l.	112 A Commander
Rockwell Int'l.	112 TC Commander
Rockwell Int'l.	114 Commander
Rockwell Int'l.	500S Shrike
Rockwell Int'l.	685 Commander
Swearingen	Merlin III-A
Swearingen	Merlin IV-A
Swearingen	Metro
Ted Smith	Aerostar 600
Ted Smith	Aerostar 601

designated to accommodate 95 percent of the fleet was used and identified a requirement of 3,400 feet.

The present length of Runway 8R-26L (4,833 feet) is believed to be adequate to accommodate most aircraft expected to use the Airport throughout the planning period, thus lengthening will not be required. However it is noted that threshold of Runway 26L is displaced 699 feet and therefore only 4,134 feet is available for landings on this runway. The full length is usable for takeoffs. The displacement is due to the location of Fairplex Drive (formerly E Street) in close proximity to the physical threshold of the runway (the end of pavement). While relocation of Fairplex Drive would be desirable from an aeronautical standpoint to eliminate the displaced landing threshold, it is unlikely. However, any future opportunities that may arise that would allow all or part of the landing length to be restored should be rigorously pursued by the County as this would increase the utilization of the Airport. Should future development plans in the immediate vicinity of Brackett Field threaten to reduce the landing length further, the proponents of such development should be advised of the detrimental effects that would result at the Airport and the County should take necessary actions to prevent such incompatible construction.

The present length of Runway 8L-26R (3,661 feet) is adequate to accommodate the small aircraft it is expected to serve.

Runway Width

Runway width is a dimensional standard that is based upon the physical characteristics of aircraft using the airport (or runway). The physical characteristic of importance is wingspan and, in this case, FAA Airplane Design Group II (wingspans up to but not 79 feet) is used for Runway 8R-26L. FAA AC 150/5300-13 specifies a runway width of 100 feet for precision instrument runways for aircraft approach categories A and B. The present width (75 feet) does not meet the standard, and thus it is recommended that the runway be widened to meet standards.For Runway 8L-26R, the present width meets FAA standards for Airplane Design Group II for non-precision instrument and visual runways. It is recommended that this width be maintained.

Runway Grades

The maximum longitudinal grade is 2 percent and both runways conform to standards as maximum gradients are 1.1 percent. The runway should have adequate transverse slopes to prevent the accumulation of water on the surface. A maximum transverse grade of 2.0 percent is recommended for the airport by FAA with the acceptable range being 1.0 to 2.0 percent. As stated above, Runway 8R-26L should be widened to a width of 100 feet. During design of this improvement consideration must be given to maintaining the required transverse slopes.

Pavement Strength

The critical aircraft in terms of pavement design at the Airport will be aircraft in the 12,500-15,000 pound range with single wheel landing gears. Runway 8L-26R is rated at 26,000 pounds for single wheel loads and Runway 8R-26L is rated at 12,500 pounds for single wheel loads. Therefore, the need for strengthening is not anticipated. It is recognized that the Airport is occasionally used by large aircraft such as military C-130s, and civilian transports such as Convairs and YS-11s. These aircraft are heavier than the critical aircraft, however, the use of these as critical aircraft would result in the over design of airfield pavements.

Runway Safety Areas

A runway safety area is defined as a rectangular area centered about the runway that is cleared, drained, graded and usually turfed. Under normal conditions, this area should be capable of accommodating occasional aircraft that may veer off the runway, as well as fire fighting equipment. For Brackett Field, the existing and planned requirement for the primary runway is an area 300 feet wide centered on the runway centerline and extending 600 feet beyond each runway end. For Runway 8L-26R, a visual runway, a smaller safety area applies. A width of 120 feet and a length extending 240 feet beyond the runway end is specified for runways which serve only small airplanes (Airplane Design Group I).

Approach Surfaces and Runway Protection Zones

The approach surface and the runway protection zone (formerly called clear zone) are important elements in the design of runways which help to ensure the safe operations of aircraft. A brief description of these two areas follows:

- ***The Approach Surface*** is an imaginary inclined plane beginning at the end of the primary surface and extending outward to distances up to 10 miles depending on runway use (i.e., instrument or visual approaches). The width and slope of the approach surface are also dependent on runway use. The approach surface governs the height of objects on or near the airport. Objects should not penetrate or extend above the approach surface. If they do, they are classified as obstructions and must be either marked or removed.

- ***The Runway Protection Zone (Clear Zone)*** is an area at ground level that provides for the unobstructed passage of landing aircraft through the above airspace. The runway protection zone begins at the end of the primary surface and has a size which varies with the designated use of the runway.

Federal Aviation Regulations Part 77 indicates that the approach surface should be kept free of obstructions to permit the unrestricted flight of aircraft in the vicinity of the airport. As the type of instrument approach to a runway becomes more precise, the approach surface increases in size and the required approach slope becomes more restrictive.

The runway protection zone is the most critical safety area under the approach path and should be kept free of all obstructions. No structure should be permitted nor the congregation of people allowed within the runway protection zone. Control of the runway protection zone by the airport owner is essential. It is desirable, therefore, that the airport owner acquire adequate property interests, preferably in fee title, in the runway protection zone to ensure compliance with the above.

As indicated above, the approach and runway protection zone dimensions are dependent on the type of approach being made to a runway. Presented in Table 5-6 are approach surface and runway protection zone dimensions for utility runways and runways larger than utility. It should be noted that the dimensions will vary based upon different combinations of instrument capabilities by runway end.

Taxiways

Runways 8R-26L and 8L-26R are both presently served by a full length parallel taxiway with a series of exit taxiways. The capacity analysis indicated that sufficient capacity was provided by the existing airfield configuration throughout the planning period thus additional improvements for capacity reasons are not warranted. However, one airside improvement that should be considered is the addition of an angled-exit taxiway for Runway 26R. The location of this exit would be in the vicinity of the control tower. This improvement would improve the flow of traffic from Runway 26R to the north side hangar areas.

The different taxiways at Brackett vary in width from 25 to 150 feet. For the most part, taxiways are 40 feet wide, however, narrower taxiways do not meet FAA ARC B-II standards which call for a width of 35 feet. Therefore, it is recommended that the South Taxiway, and the segments of Taxiways C and F south of Runway 8R-26L be widened to meet FAA standards. To maintain consistent taxiway widths as much as possible on-airport, taxiways should be widened to 40 feet.

Another taxiway improvement that is recommended is the addition of a holding apron at the western end of the North Taxiway. This would provide an area for aircraft holding for departure and run-ups on Runway 8R outside the runway protection zone for Runway 8L.

Helicopter Facilities

As discussed in previous technical reports, Brackett Field has become somewhat of a mecca for helicopter activity in the southern California region. The number of based helicopters and operations have sharply increased. Air traffic controllers estimate that helicopter operations can, at times, be 15 to 20 percent of activity at the Airport. Practice facilities have been constructed and procedures established to accommodate this increase. Due to the proliferation of helicopter operations it is recommended that the practice pad be marked for use as a heliport. Additionally, the proposed Sheriff's Department facility will include landing pads for helicopter operations by the Aero Bureau.

Table 5-6
APPROACH SURFACE AND RUNWAY PROTECTION ZONE REQUIREMENTS

Runway	Type Approach	Slope	Length (feet)	Width at Inner End (feet)	Width at Outer End (feet)
APPROACH SURFACE:					
Larger than Utility	Precision	50:1 first 10,000' 40:1 next 40,000'	50,000	1,000	16,000
Larger than Utility	Non-Precision Min. as low as 3/4 mile	34:1	10,000	1,000	4,000
Larger than Utility	Non-Precision Min. less than 3/4 mile	34:1	10,000	500	3,500
Larger than Utility	Visual	20:1	5,000	500	1,500
Utility	Non-Precision Min. less than 3/4 mile	20:1	5,000	500	2,000
Utility	Visual	20:1	5,000	250	1,250
RUNWAY PROTECTION ZONE:					
Larger than Utility	Precision		2,500	1,000	1,750
Larger than Utility	Non-Precision Min. as low as 3/4 mile		1,700	1,000	1,510
Larger than Utility	Non-Precision Min. less than 3/4 mile		1,700	500	1,010
Larger than Utility	Visual		1,000	500	700
Utility	Non-Precision Min. less than 3/4 mile		1,000	500	800
Utility	Visual		1,000	250	450

Airspace and Navigational Aids

Analysis of Brackett Field's airspace, as previously noted, revealed no problems or restrictions under VFR conditions. Presently, the Airport is equipped with an instrument landing system, is controlled by an FAA control tower, and has various visual aids, and thus can operate under most weather conditions and accommodate most aircraft.

The instrument landing system is restricted to use by Category A and B aircraft because of the non-standard glide slope (3.76° as opposed to the standard 3°), runway length and width. The ILS does not have an approach light system (ALS) and the addition of a Simplified Short Approach Light System (SSALS) would enhance visual guidance in the final phase of an instrument landing maneuver.

Both Runways 8R and 26L are served by Visual Approach Slope Indicator (VASI) systems. Within the last few years, FAA has stated that Precision Approach Path Indicator (PAPI) systems shall be the only visual glide path aids to be installed at airports under Airport Improvement Program funding grants. Thus, replacement of the existing VASIs by PAPIs some time during the planning period may be considered as needed. The FAA document Airway Planning Standard Number One-Terminal Air Navigation Facilities and Air Traffic Control Services (FAA Order 7031.2C) contains criteria for identifying candidate airports for navaids and visual aids. The criteria for navaids are based upon the number of annual instrument approaches (AIA) and for visual aids, criteria are keyed to the number of annual landings per runway.

Based upon criteria in FAA Order 7031.2C, Runway 26R qualifies for the installation of a PAPI system at present activity levels. Runway 8L will qualify for a PAPI in the long-range planning period (11-20 years). A runway is a candidate for a visual glide path aid if the annual number of GA landings on a non-ILS runway are at least 14,000. Guidelines are provided in the document for estimating runway utilization. For Runway 26R, assumed to be the second busiest runway, 25 percent of the landings are estimated to occur on the runway. Based on 1989 traffic, this translates into 26,330 landings, which is well above the qualifying activity threshold. Runway 8L is assumed to be the least used runway, handling 10 percent of all landings. Based on the year 2010 forecast of operations (approximately 280,000) that could be expected to operate on the runways (i.e., excluding most helicopter traffic), the runway reaches the level of 14,000 landings and is also a candidate for a PAPI. The installation of PAPIs on Runway 8L could also serve as a noise abatement improvement as it would prevent approaching aircraft from descending below the proper glide path which could result in noise complaints from residences northwest of the Airport situated on much higher ground than the runway. This would promote a "good neighbor" policy in this regard.

A runway is a candidate for runway end identifier lights (REILS) if there are at least 7,300 annual GA and military landings per year, is not currently equipped or programmed for an approach light system, and is lighted and approved for night operations. These lights provide rapid and positive identification of the approach end of a runway and consist of two synchronized flashing lights located on each side of the runway threshold. FAA Order

7031.2C provides estimates of runway utilization for use if actual data is not available. Runway 26R would qualify immediately if it was lighted and approved for night operations. Therefore, any potential runway lighting project for Runway 8L-26R should include provision of REILs on Runway 26R.

It is further recommended that Runway 8L-26R be lighted for nighttime operations within the planning period. This would double the hourly VFR night capacity which could be especially beneficial during shortened daylight periods of the winter months.

LANDSIDE FACILITY REQUIREMENTS

The airport landside system is comprised of all facilities supporting the movement of passengers and goods between the community's ground transportation system and the airport's airside system, and also any facilities used in the maintenance or protection of those facilities. For Brackett Field, these include terminal, general aviation, and airport support facilities. The landside elements, together with the previously discussed airside elements, form all of the airport development facilities required to accommodate the forecast level of traffic.

Since the airfield development program has been based upon an ultimate level of some 357,000 operations and 622 based aircraft, the planning of landside facilities should be based upon striking a balance of airside and landside capacity. The determination of general aviation and support area facilities has been accomplished for the three future planning periods of 1995, 2000 and 2010.

Administration/Terminal Building

The amount of terminal space required is based upon the expected demand, i.e., the peak hourly volume of pilots and passengers who will use the facilities. The planning standard of 49 square feet per peak hour pilot/passengers is used to determine the required area. An estimated 2.5 pilot/passengers are assumed per peak hour operation. Table 5-7 shows the building requirements that were calculated using the above approach.

Table 5-7
GENERAL AVIATION TERMINAL AREA REQUIREMENTS

Item	1995	2000	2010
Peak Hour Operations	76	81	92
Total Peak Hour Occupants	190	203	230
Area/Occupant (SF)	49	49	49
Total Building Area (SF)	9,310	9,950	11,270

Source: P&D Technologies

There presently exists approximately 10,800 square feet of administration/GA terminal space with most of it (8,360 SF) being provided in the terminal building. The balance of the area is provided at two FBOs - Runway 3-7 and Air Vision. Since the existing facilities nearly meet the requirement for the year 2010, expansion of the terminal building is not deemed necessary. This should be monitored, particularly in the longer term to determine if expansion is required to meet private pilots, and potential charter and air taxi operators. It is believed that a second story addition to the existing building would satisfy significant needs for terminal space. Airport management offices and the pilots lounge could be relocated to a second floor and if additional space is still required, the building can be expanded to the west and east. Expansion of the building to the west is preferred to preserve the small park and observation area to the east.

Aircraft Parking Apron

Aircraft parking apron is required primarily for visiting transient aircraft. These are aircraft that land at Brackett Field, but are based elsewhere. A busy itinerant day is derived from the average day of the peak month forecasts (ADPM) of aircraft activity and forms the basis of estimating transient parking apron requirements.

Transient aircraft parking apron requirements are determined by applying the following assumptions to itinerant movements performed by transient aircraft on an ADPM.

- Transient operations are approximately 60 percent of itinerant fixed wing operations.
- The majority of transient aircraft will arrive and depart on the same day, thus it is assumed that the actual number of aircraft utilizing the parking apron is one-half (50 percent) of the transient movements being performed on the average day of the peak month.
- During the planning period, 50 percent of the transient aircraft will be on the ground at any given time.
- Thus, 25 percent of transient operations will be temporarily parked on the transient apron.
- Single engine aircraft require 2,700 square feet (300 square yards) of apron space; multi-engine aircraft require 5,625 square feet (625 square yards); and business jets require 14,400 square feet (1,600 square yards) of apron for parking and maneuvering.

Summarized in Table 5-8 are the transient apron requirements. The analysis concluded that roughly 26,100 square yards of apron will be required to accommodate transient demand in 2010. There is approximately 23,500 square yards of apron immediately east of the terminal building parking lot (including the fuel island) that already partly serves as the transient apron. This location in its entirety should be retained for transient use. Based on the present tie-down configuration on the apron it is believed that the number of daily transient

Table 5-8
TRANSIENT AIRCRAFT TO BE ACCOMMODATED ON TRANSIENT AIRCRAFT APRON

Number of Aircraft to be Accommodated		1995	2000	2010
Annual Transient Operations		64,900	69,600	80,000
Peak Month Transient Operations		6,100	6,540	7,520
ADPM Transient Operations		196	211	243
Number of Aircraft Parked		49	53	61
Size of Transient Aircraft Apron				
Single Engine:	Number of Aircraft [a]	32	35	40
	Area/Aircraft (SY)	300	300	300
	Apron Area (SY)	9,600	10,500	12,000
Multi-Engine:	Number of Aircraft [a]	16	17	20
	Area/Aircraft (SY)	625	625	625
	Apron Area (SY)	10,000	10,625	12,500
Business Jet:	Number of Aircraft [a]	1	1	1
	Area/Aircraft (SY)	1,600	1,600	1,600
	Apron Area (SY)	1,600	1,600	1,600
Total Aircraft		49	53	61
Total Apron Area (SY)		21,200	22,725	26,100

[a] Based upon estimated mix of transient aircraft

Source: P&D Technologies

aircraft to be parked in the year 2010 (61) can be accommodated on the apron, despite an apparent shortage of 2,600 square yards. The apron immediately to the north and adjacent to the terminal building can serve as an overflow transient apron and should also be reserved for this use.

Based Aircraft Storage

Aircraft based at the Airport will be stored either by occupying a paved tie-down parking space or by storage within a hangar. The number of aircraft stored in hangars varies

according to the economics of providing hangars and the severity of weather conditions prevailing at the airport location. The number of based aircraft at Brackett Field is expected to increase from the present level of 492 to 622 aircraft in the year 2010. Adequate storage facilities should be provided to accommodate forecast based aircraft. In determining the demand for the various types of storage, the following assumptions tempered through previous experience and present trends at the Airport were made:

- Approximately 55 percent of the present based aircraft at Brackett Field are stored in hangars. There is also a long waiting list for hangar space.

- Based on the aircraft owners survey conducted, additional T-hangars was ranked as the highest priority improvement desired at the Airport.

- Of 43 survey respondents that presently store aircraft at Brackett on tie-downs, 12 percent indicated a preference for hangars if more hangar space was available.

- Of 72 respondents basing aircraft at other airports, 32 percent indicated that the provision of additional hangars at Brackett would cause them to move their aircraft to the Airport. This was the second most frequent response after lower fees (61 percent).

- Based on the present percentage of based aircraft that are hangared at the Airport and the above responses obtained from aircraft owners it will be assumed in this analysis that storage hangar space be provided to accommodate two-thirds of the based aircraft at Brackett Field. This translates into space for 349 aircraft in 1995, 370 aircraft in year 2000, and 415 aircraft at the end of the planning period in 2010.

- Approximately two-thirds of the based single engine aircraft will be stored in T-hangars. The remaining one-third will use tie-downs.

- Approximately 75 percent of based multi-engine aircraft will be stored in T-hangars. The remaining 25 percent would utilize paved tie-down space.

- Approximately 90 percent of the based turboprops would be stored in hangars similar to those now at Rows C and G (Executive size hangars).

- All based business jets will be stored in conventional hangars.

- Fifty percent of based helicopters will be stored in conventional hangars and 50 percent will use tie-downs.

This analysis will address aircraft storage hangars first, of which there are two types. T-hangars are "T" shaped hangars designed for the storage of individual aircraft while conventional hangars are large structures that will accommodate several aircraft of different sizes in an open bay. In this case, T-hangars could also include individual, rectangular, executive-size hangars. For the purpose of this analysis, T-hangar requirements are

determined as number of spaces, or units, and conventional hangar requirements were calculated using the following allowances:

Aircraft Type	Hangar Space Required (SF)
Single Engine/Helicopter	1,620
Multi-Engine/Turboprop	3,150
Business Jet	4,500

Table 5-9 summarizes the conventional hangar floor area and T-hangar space requirements determined in this analysis. When the existing hangar areas are compared to the required facilities presented in Table 5-9, deficiencies become apparent. The tabulation below summarizes the deficiencies in hangar space if existing facilities are not expanded. The deficiencies, given for each planning period, are as follows:

		Deficiency		
Item	Existing	1990-1995	1996-2000	2001-2010
T-Hangar (Spaces)	260	76	95	135
Conventional Hangar (SF)	0	38,340	44,460	58,320

The above deficiencies represent the difference between required facilities (Table 5-9) and existing facilities. Since the existing conventional hangar space (30,400 SF) is dedicated to aircraft maintenance and not storage, existing facilities are assumed to be zero, as shown above.

Three approaches are available to the County in providing hangars. The first would involve leasing land to aircraft owners and allowing them to construct their own hangars. To assure uniformity in construction as well as visually pleasing results, the airport owner (the County) could control the type of hangar built by a clause in the land lease. An alternative to the above would be for the airport owner to construct the hangars and then rent or lease them to aircraft owners. If this approach is followed, firm commitments for their use should be made before construction of the hangars are undertaken. A third approach is to have a complex of hangars built by a private party on property leased by the airport.

The alternative to aircraft storage hangars is to provide space on the parking apron with tie-down facilities to secure the aircraft during severe weather or periods of high winds. For planning purposes, an allowance of 300 square yards for single engine and 625 square yards for multi-engine, turboprops and helicopters has been used to calculate the size of the based aircraft tie-down area. Table 5-10 contains the calculation and size of the tie-down area for each of the future planning years.

The tie-down apron plus the transient aircraft apron represent the total apron requirements for Brackett Field. The tabulation below summarizes the total apron (tie-down plus

Table 5-9
BASED AIRCRAFT STORAGE HANGAR REQUIREMENTS-BRACKETT FIELD

	1995	2000	2010
Single Engine Piston			
Number of Based Aircraft	468	494	543
Number of Aircraft in T-Hangar*	309	325	359
Multi-Engine Piston			
Number of Based Aircraft	31	34	40
Number of Aircraft in T-Hangar*	23	26	30
Turboprop			
Number of Based Aircraft	4	4	7
Number of Aircraft in T-Hangar*	4	4	6
Business Jets			
Number of Based Aircraft	6	7	9
Number of Aircraft in Conv. Hgr.	6	7	9
Area/Aircraft (SF)	4,500	4,500	4,500
Conventional Hangar Floor Area (S	27,000	31,500	40,500
Helicopters			
Number of Based Aircraft	14	16	23
Number of Aircraft in Conv. Hgr.	7	8	11
Area/Aircraft (SF)	1,620	1,620	1,620
Conventional Hangar Floor Area (S	11,340	12,960	17,820
Total Based Aircraft	523	555	622
Total Aircraft Hangared	349	370	415
Required T-Hangars (Spaces)	336	355	395
Required Conv. Hangar Area (SF)	38,340	44,460	58,320

Source: P&D analysis

*Represents required T-hangar space

Table 5-10
BASED AIRCRAFT TIE-DOWN AREA REQUIREMENTS-BRACKETT FIELD

	1995	2000	2010
Single Engine Piston			
Number of Based Aircraft	468	494	543
Number of Aircraft Tied-Down	159	169	184
Area/Aircraft (SY)	300	300	300
Apron Area (SY)	47,700	50,700	55,200
Multi-Engine Piston			
Number of Based Aircraft	31	34	40
Number of Aircraft Tied-Down	8	8	10
Area/Aircraft (SY)	625	625	625
Apron Area (SY)	5,000	5,000	6,250
Turboprop			
Number of Based Aircraft	4	4	7
Number of Aircraft Tied-Down	0	0	1
Area/Aircraft (SY)	625	625	625
Apron Area (SY)	0	0	625
Business Jets			
Number of Based Aircraft	6	7	9
Number of Aircraft Tied-Down	0	0	0
Area/Aircraft (SY)	1,600	1,600	1,600
Apron Area (SY)	0	0	0
Helicopters			
Number of Based Aircraft	14	16	23
Number of Aircraft Tied-Down	7	8	12
Area/Aircraft (SY)	625	625	625
Apron Area (SY)	4,375	5,000	7,500
Total Based Aircraft	523	555	622
Total Aircraft Tied-Down	174	185	207
Total Apron Area (SY)	57,075	60,700	69,575

Source: P&D analysis

transient) requirements. As seen, the existing 155,300 SY of apron area will accommodate projected parking demand through the planning period. As also previously noted in Section 3, the tie-downs are approximately only 20 percent occupied.

Period	Existing Apron Area (SY)	Required Apron Area (SY)	Additional Apron Required (SY)
1990-1995	155,300	78,275	0
1996-2000	155,300	83,425	0
2001-2010	155,300	95,675	0
Total Additional Apron Required			0

During preparation of this master plan the concern over potential increases in vehicle trips on surrounding streets and parking demand due to increases in hangar space was expressed. While circulation impacts are addressed in greater detail in the Initial Study of the master plan, the following can be stated.

- Based aircraft are projected to increase about 122 by the year 2010. Using Institute of Transportation Engineering (ITE) Trip Generation Rates for general aviation airports, an increase from 1,475 average daily traffic (ADT) in 1990 to 1,815 ADT in 2010 was estimated. Much of the increase would occur as based aircraft increase, regardless of the planned airport improvements.

- Based on the above, it is concluded that the future airport development will not have a significant affect on vehicle traffic and circulation in the airport vicinity. The only increase in Level of Service (LOS) is on one segment of roadway - a segment of Fairplex Drive east of McKinley Avenue which is expected to increase from LOS A to LOS B. This would occur regardless of increases of airport traffic volumes. Generally, LOS C is acceptable to most communities to prevent over-building of road capacity. The Airport's total contribution of ADT for the segment of Fairplex Drive will be approximately 5 percent. Since the incremental increase in vehicle traffic generated by the airport is very minor, the master plan does not include off-site roadway improvements.

- Aircraft owners typically park their automobiles in their hangar or tie-down space. This practice is encouraged by the airport management and allowed by the language of the rental agreements. This practice will continue so that off-airport parking due to additional hangars is not envisioned.

Aircraft Maintenance Facilities

Maintenance facilities play an important role at any active airport as they permit the based and transient aircraft to receive the full line of services necessary for safe flight. To

accommodate this need for aircraft maintenance, facilities should be planned to provide this service. Aircraft maintenance is currently provided by Blue's, Brackett Aircraft Radio, Aerofix, Southwestern Avionics and Westair Instruments in a number of hangars and buildings providing approximately 33,400 SF of maintenance area. For projecting future maintenance facility requirements a factor of 75 square feet of aircraft maintenance area per based aircraft was used. P&D has found this to be a reasonable relationship between based aircraft and maintenance facilities at GA airports. By applying this factor to the forecast of based aircraft, the following requirements for total aircraft maintenance facilities are determined:

Year	Maintenance Facility Requirement
1995	39,225 SF
2000	41,625 SF
2010	46,650 SF

Thus it is concluded that an additional 13,250 SF of maintenance hangars should be added over the course of the planning period. It should be noted that adequate apron should be planned for maintenance hangars with allowances for clearances between aircraft and building, aircraft towing/taxiing and parking positions for run-ups and maintenance checks.

Automobile Parking

There is sufficient existing automobile parking to meet the 20 year requirement. Parking areas must be provided at the Airport for those using its facilities. The parking areas are designed to accommodate peak activity periods. A generally accepted value for computing the amount of general aviation parking space needed is 1.3 spaces per peak hour general aviation pilot/passenger. This factor takes into account airport employees, rental car spaces, and visitors as well as pilots/passengers. The area required per automobile is 350 square feet, which includes circulation routes and other necessary clearances within the parking area. The projected auto parking requirements are summarized in Table 5-11. There are approximately 340 parking spaces at the terminal building and at the Pomona Aero Center area, Brackett Radio/T.N.G. Helicopter area and at Runway 3-7. Additionally, most based aircraft owners will park in their hangar or tie-down space as allowed in rental agreements. These account for parking for over 680 aircraft owners. Thus, based on a comparison of existing facilities with future requirements, additional parking spaces are not required through the 20-year planning period. However, it has been noted that congestion on taxiways between the north T-hangars does, at times, make taxiing difficult. Auto parking along Puddingstone Drive, if possible, would alleviate these situations.

Table 5-11
AUTOMOBILE PARKING REQUIREMENTS

Item	1995	2000	2010
Peak Hour Operations	76	81	92
Total Occupants	190	203	230
Spaces/Occupant	1.3	1.3	1.3
Total Parking Spaces (Each)	247	263	299
Area/Parking Space (SF)	350	350	350
Total Parking Area (SF)	86,450	92,050	104,650

Source: P&D Technologies

Aircraft Rescue and Firefighting (ARFF) Facilities

FAA Advisory Circular 150/5210-6C establishes recommended scales of fire fighting protection for general aviation airports. Presented in the AC are two indices used in determining the level of protection based on the types of aircraft and the number of operations. The two indexes are as follows:

- Index 1 Airports having at least 1,825 annual departures of aircraft more than 30 feet but no more than 45 feet long.

- Index 2 Airports having at least 1,825 annual departures of aircraft more than 45 feet but not more than 60 feet long.

The recommended scales of protection for the two indexes are summarized in Table 5-12. Based upon the above criteria, compliance with Index 1 is not required.

However, the airport presently has one fire truck with a water capacity of 250 gallons and dry chemical capacity of 450 pounds. It pumps at 175 gallons per minute. The vehicle is intended for initial response as responsibility for fire protection lies with the City of La Verne. It is recommended that a building be dedicated for the sole purpose of housing the vehicle. The original storage building for the fire truck is presently used as an airport maintenance building.

Airport Maintenance

Facilities are needed at an airport to house equipment and provide a working area for airport maintenance. Present facilities at Brackett include a two-bay structure immediately

Table 5-12
FIRE FIGHTING PROTECTION REQUIREMENTS FOR GENERAL AVIATION AIRCRAFT

	Primary Agents				Supplemental Agent	
	AFFF		OR Protein Foam			
Index	Water for Foam Production (Gallons)	Solution Application Rate (gpm)	Water for Foam Production (gallons)	Solution Application Rate (gpm)	Dry Chemical Powders (pounds)	Number of Vehicles
1[a]	190	150	290	300	300	1
2	310	230	490	400	400	1

[A] Rounded off to the nearest 10 gallons. For practical application, vehicle water requirements should be adjusted to coincide with conventional water tanks of 200, 300 and 500 gallon capacities.

Source: FAA Advisory Circular 150/5210-6C, Aircraft Fire and Rescue Facilities and Extinguishing Agents.

west of the terminal building. The building presently houses the fire truck and one other County vehicle, as well as serving as a shop area. This arrangement does not provide adequate space for the maintenance functions, thus it is recommended that a new separate building be constructed for airport maintenance purposes. This will provide sufficient space for airport maintenance and fire truck storage.

Aviation Bulk Fuel Storage

Bulk fuel storage requirements were determined for the Airport and based upon the forecast of fuel flowage contained in Section 4. Fuel flow was projected in gallons pumped per peak month for 100 Octane and Jet A fuels. Assuming a 7 day storage capacity as an ideal inventory, the bulk fuel storage capacity can be determined. Based on this approach, it was found that adequate storage capacity is provided by existing tanks (15,000 gallons for 100 Octane and 15,000 gallons for Jet A).

However, as explained in Section 3, there have been occurrences when the fuel supply has been exhausted during peak fuel flow periods because the minimum order for a delivery could not be met. To safeguard against these events, a 7 day inventory based on peak sales was used. This resulted in an existing storage capacity requirement of 21,000 gallons for 100 Octane - with the Jet A capacity being satisfactory. This implies that an additional 6,000 gallons storage should be added. However, considering the present bulk price benefits associated with the minimum delivery of 9,000 gallons it is recommended that an additional 10,000 gallon tank be added for 100 octane avgas to accommodate demand through the planning period. Storage for Jet A is adequate for future demand.

GROUND ACCESS

The ground access element of this analysis is based data obtained from the City of La Verne Designated Specific Plan.[1] This previous study projected E Street (Fairplex Drive) as reaching a volume to capacity (V/C) ratio of 1.4 between Puddingstone Drive and McKinley Avenue. This means that the projected daily traffic volumes, estimated at 16,800 trips (which included 1,100 airport generated trips) exceeded the daily capacity of the roadway by 40 percent. This was based on a daily capacity of the then two lane E Street of 12,000 trips. Present capacity of this stretch of road has been increased to 24,000 due to its recent widening to four lanes. Sufficient capacity is now available to accommodate airport generated trips far in excess of the 1,100 estimated. This volume of airport traffic, estimated as the difference between daily capacity and volume plus the original 1,100 (8,300 trips), is not envisioned within the planning period. Thus the local roadway system should be adequate to accommodate airport generated traffic together with all other traffic.

[1]La Verne Designated Specific Plan Area Traffic Analysis. Kunzman Associates, 1983.

AIRCRAFT OWNERS SURVEY

Survey Sample

A mail-out questionnaire survey of aircraft owners in the Brackett Field market area was conducted to solicit input on user preference and facility requirements. It included owners based at Brackett Field and elsewhere. A copy of the questionnaire is included in Appendix C. A mailing list of aircraft owners in the Southern California area was obtained from the Aircraft Owners and Pilots Association (AOPA). The County identified the areas to be surveyed and mailed out the survey forms. Table 5-13 lists the cities included in the survey. Over 1,500 questionnaires were mailed and approximately 300 responses were returned and tabulated.

Survey Results

The key results of the survey are highlighted in this subsection.

- Of the aircraft owners responses received approximately 40 percent based their aircraft at Brackett Field and 60 percent elsewhere. For respondents basing elsewhere, 83 percent are at four airports - El Monte (31 percent), Cable (25 percent), Chino (16 percent) and Corona (11 percent).

- The main improvements that respondents listed in order of priority were hangar expansion, fueling (including servicing), restaurant, wash rack, navaids, runway/taxiway improvements, hangar maintenance, lower fees, and improved security.

- Existing facilities and services were generally rated as above average. However, hangar facilities were rated as below average indicating a need for more hangars. All rates and charges were ranked as higher than average, with many owners believing hangar rates to be very high.

- The three top physical improvements owners listed were additional T-hangars, wash racks, and an expanded security program.

- Sixty-four percent of Brackett Field based respondents store their aircraft in hangars. If more hangars were available, this figure would increase to 69 percent.

- On average, pilots spend $6,750 annually for aircraft operations. This includes aircraft storage, fuel, maintenance, and insurance.

Table 5-13
CITIES CONTAINED IN AIRCRAFT OWNERS SURVEY

City	Zip Code	City	Zip Code
Alhambra	91801-802	Montclair	91763
Altadena	91001	Monterey Park	91754
Arcadia	91006	Ontario	91762
Azusa	91702	Pasadena	91101-91125
Brea	92622	Pomona	91765-769
Chino	91709	San Gabriel	91775
Claremont	91711	San Dimas	91773
El Monte	91731-734	Sierra Madre	91024
Glendora	91740	South Pasadena	91030
La Habra	90632	Upland	91785-86
La Puente	91747	Walnut	91789
La Puente	91744-748	West Covina	91790-793
La Verne	91750	Whittier	90601-608
Monrovia	91016	Yorba Linda	92686

- Of the aircraft owners based elsewhere, the main improvements listed that would cause them to shift to Brackett Field were lower fees, additional hangars and fueling improvements.

- Transient flyers on average visit Brackett 20 times a year. The average distance from the home airport is 20 miles. (Note that these are only for survey respondents who reside in the Southern California region). Sixty-four percent used fueling facilities, 45 percent used maintenance services, and 13 percent used overnight tie-downs. Of 70 respondents who used services near Brackett Field, 87 percent indicated restaurants as a service used.

- Average household income of survey respondents was $87,000.

FBO SURVEY

As discussed in Section 3, major FBO's at Brackett were interviewed to obtain their input on facilities they believe are needed. The facilities most often mentioned were hangars, a high quality/central FBO with a wide range of services and helicopter facilities.

ON-AIRPORT LAND USE

One of the objectives of the master plan is to identify the extent of development needed to accommodate future aviation demand and develop a plan that locates the required facilities on the Airport. At Brackett Field, land is a scarce resource as existing facilities and aircraft operating areas utilize most of the 257.5 acres that comprise the Airport. The preceding analyses identified the airport facilities that will be needed to handle traffic at the Airport through the year 2010. This part of the planning process will identify the land areas needed for the aviation facilities. Once identified, it will be possible to determine if sufficient land is available for future airport development and if any land is available after aeronautical needs are met to develop as possible non-aviation use. The latter offers potential for generating additional revenues from airport property that otherwise may sit undeveloped. However, development of airport parcels to non-aviation uses should be undertaken only when it is proven that the long-term aviation demands can be accommodated.

Thus with these objectives in mind, the analysis of on-airport land use was guided by the following assumptions:

- Top priority is given to providing land to accommodate the facility requirements identified for the year 2010.

- Replacement of one type of airport component by another (i.e., building hangars on existing apron) will be avoided in this analysis to insure that sufficient room is available to accommodate demand that is greater than forecast. Later planning tasks may consider and/or recommend such replacement, however, at this stage of the planning analysis replacement will not be assumed.

- Since the vacant land at the intersection of Fairplex Drive and McKinley Avenue is an attractive parcel for non-aviation use, if possible, this will be the last area on the airport considered in this analysis for development of aviation facilities.

Existing On-Airport Land Use

The initial step in the land use analysis is to identify the current uses of airport property. This forms the basis of the overall land use plan which will include strategies for existing undeveloped areas. Figure 5-1 presents the existing land uses at Brackett Field. The land uses have been broadly classified for the purposes of this analysis into the categories discussed below.

The ***landing/approach area*** is defined as that area on-airport that lies within the building restriction lines and runway protection zones (formerly clear zones). It includes the runways, taxiways, associated safety areas and lateral clearances, and runway approaches. It was noted in Section 3 that a number of existing structures lie within the typical building restriction lines (BRL) for a precision instrument runway such as Runway 8R-26L and that future consideration must be given to establishing a suitable BRL to accommodate landside

facilities without compromising safety of aircraft operations. The FAA recommends a BRL set at 750 feet from the centerline of a precision instrument runway, however, the airport sponsor can establish the BRL setbacks at a distance less than the FAA recommendation. Considering that a BRL set at 750 feet from Runway 8R-26L is violated by more that one-half the existing major structures, and would preclude most landside development, this analysis is based on a south BRL defined as follows. The existing BRL is located 350 feet from the centerline of Runway 8R-26L and this is maintained in this analysis from the terminal building east to the Ranger hangar building. However, east of the Ranger hangar the BRL is set at 500 feet from the centerline of Runway 8R-26L with minor deviation around the existing Pomona Police Department hangar. This offers enhanced protection from encroachment of buildings near the most critical runway end (i.e., the runway equipped with the ILS). There are no existing structures within this line. The north BRL is recommended as it presently exists, setback 550 feet from 8R-26L (250 feet from 8L-26R). On the north side, existing buildings do not lie within this suggested BRL. These appear to be a reasonable compromise to the FAA recommendation. Additionally it is noted that the suggested BRL are more restrictive than former FAA standards for a precision instrument runway at utility airports which precluded any object from penetrating surfaces originating 300 feet from the runway centerline and sloping laterally outward at a slope of 4:1.

A practice landing pad for helicopter training exists to the north of the holding apron for Runway 8L-26R. The pad is very effective for managing the helicopter activity from an air traffic standpoint as helicopter operations are diverted from the runways and the associated traffic patterns. For the purpose of this analysis a helicopter landing/approach area is delineated by the landing pad (approximately 30' x 30') and an 8:1 approach surface as defined in FAR Part 77 extending 400 feet from the landing area. This in effect provides a clear zone for this heavily used helicopter operating area. The area defined by the above criteria is almost entirely contained within the critical area for the glide slope (see below).

There are ***critical areas*** associated with electronic navigational aids on the airport. These areas basically provide a clear area in the vicinity of a navaid antenna that protects from the unlimited movement of surface traffic and insures the continuous integrity of the navaid signal. For the most part the critical areas are encompassed within the landing/approach area, but as seen in Figure 5-1, a portion of the critical area associated with the glide slope extends beyond the landing/approach area.

Areas of the Airport presently developed to provide landside aviation facilities are shown on Figure 5-1 as ***existing aeronautical use areas***. This would include FBOs, storage hangars, tie-downs and transient aprons.

The last two land uses shown on Figure 5-1 are ***airport access/auto parking*** and ***ancillary leasehold***. The latter includes the Brackett Air Business Park, FAA control tower and the newly developed Mt. San Antonio College facility on the north side of the airfield.

The approximate breakdown of land uses shown on Figure 5-1 are as follows:

- Landing/approach area - 138 acres
- Critical areas (outside the landing/approach area) - 6 acres
- Existing aeronautical use - 51 acres
- Airport access/auto parking - 4 acres
- Ancillary leaseholds - 5 acres

Land Use Analysis

Review of Figure 5-1 concludes that there are three primary tracts of airport land that are vacant and which could be developed. These are an approximate 12 acre tract on the northwest corner of the Airport; an approximate 5 acre parcel along Puddingstone Drive in between the control tower and the remote transmitter equipment shelter; and, an 11 acre area at the southeast corner of the Airport at the intersection of McKinley Avenue and Fairplex Drive. Additionally, two other vacant parcels exist that can be developed but may offer less potential. These are the hill south of the terminal where the airport beacon is located and a small triangle of land north of the flood channel along Puddingstone Drive.

Having defined the areas suitable for development it is possible to determine if sufficient area is available to accommodate the facilities needed to serve the forecast demand. The facility requirements analysis concluded that significant expansion of the runway/taxiway system is not needed during the planning period and thus the landing/approach area as defined above will not expand. The landside components that utilize large areas of airport property are aircraft aprons and hangars. The analysis of landside facilities indicated that additional apron to accommodate based and transient aircraft will not be required to meet 2010 demand levels and therefore the primary focus of the land use analysis centered on providing space for the ultimate requirement for 135 T-hangars, approximately 60,000 SF of conventional hangars for aircraft storage and an additional 13,000 SF of aircraft maintenance hangar.

The analysis was based upon two scenarios. One which could use all available vacant areas as hangar locations and a second which restricted the use of hangar development in the northwest corner. The latter was included to allow a site for one or two tenants, since inquiries have been made to the County Department of Public Works (Aviation Division) by the Sheriff's Department to locate it's Aero Bureau at Brackett.

Under the first scenario the majority of the T-hangar requirements can be accommodated at the northwest parcel. This scenario assumed the site was not developed by the Sheriff Department. Figure 5-2 presents a possible hangar arrangement for this option with approximately 110 T-hangar units in this area. The balance of hangar requirements can be met on the south side of the airfield by adding a row of hangars to the north of the two existing County hangars and another row at the southeast corner. Conventional hangars can be located along the access road for Brackett Radio and the Pomona PD and on the parcel along Puddingstone Drive in between the control tower and remote transmitter shelter. The relocation of the ceilometer projector and transmitter could be required depending upon the extent of development on this tract.

Figure 5-3 presents a plan for providing hangars while preserving the 12 northwest parcel for potential development by the Sheriff's Department Aero Bureau. To provide the required hangars it is necessary to use the southeast parcel. This plan shows approximately 110 hangar units in the southeast corner with the balance of the requirements met along Puddingstone Drive and by adding a row of hangars to the north of the County hangars along McKinley Avenue. To provide room for the required conventional hangars it is necessary to use part of the 12 acre northwest parcel. However, this would be a use consistent with tenants such as FBO or flight departments.

Thus it is concluded that for both scenarios sufficient land will be available for hangar development needed to accommodate the demand through the year 2010. The first scenario offers greater flexibility and potential for developing some of the vacant area for non-aviation use. In the second scenario, essentially all vacant land is required for future hangars.

Existing Leases

Existing leases at Brackett Field are graphically identified in Figure 5-4 and briefly described in Table 5-14. Not included in the tabulation are aircraft owners leasing tie-down space from the County. However for the purposes of estimating annual revenue it is assumed that 20 percent of the tie-downs (60 spaces) are occupied at an average rent of $75 per month. This results in an annual revenue of $54,000 out of a possible average of $270,000. The present County tie-down area of just over approximately one million square feet is yielding five cents per square foot out of a possible 27 cents. Review of Table 5-14 indicates that county hangar rentals provide the highest yield per square foot of sizable areas.

Table 5-14
EXISTING LEASES AT BRACKETT FIELD

Location	Tenant	Area (SF)	Annual Revenue	Revenue Per SF	Remarks
A	Mt. San Antonio College	96,634	$13,200	$0.14	
B	Parker Aero Development	144,480	$27,888	$0.19	Hangars will revert to County in 2008
C	Aircraft Owners	175,520	$124,788	$0.71	County hangars Rows G-H
D	Runway 3-7	78,550	$28,752	$0.37	
E	Aircraft Owners	346,775	$352,536	$1.02	County hangars Rows A-B-C-D-E-F
F	Aerofix	6,300	$3,600	$0.57	
G	FAA	22,500	$1	$0.00	Control tower
H	Aircraft Owners	48,600	$50,376	$1.04	County-owned Port-a-ports
I	Brackett Air Business Park	113,560	$37,200	$0.33	Buildings will revert to County in 2021
J	Brackett Aircraft Radio	106,650	$23,988	$0.22	Hangars will revert to County in 2003-04
K	Pomona Police Dept.	68,000	$10,884	$0.16	Hangar will revert to County in 1996
L	T.N.G. Helicopters	98,640	$60,000	$0.61	3 year term with rent escalation
M	Ranger Hangars	152,024	$29,772	$0.20	Hangar will revert to County in 2006
N	Aircraft Owners	122,500	$103,200	$0.84	County hangars Row S
O	Blue's	127,195	$59,352	$0.47	County-owned hangar
P	Norm's Restaurant	1,776	$16,800	$9.46	In terminal building
Q	John's Pilot Supplies	400	$5,160	$12.90	In terminal building
R	Westair Instruments	1,406	$8,556	$6.09	
	TOTAL	**1,711,510**	**$956,053**	**$0.56**	

Source: P&D analysis.

Notes: 1. Locations keyed to Figure 5-4.
2. Rentals of County tie-downs not included.

Section 6
Concept Development

INTRODUCTION

This chapter addresses the future development concept for Brackett Field and the rationale upon which it is based. The concept defines in general terms the different areas on-airport and the type of development recommended for each area. It therefore is the basis for the airport layout plan (ALP) that will be prepared as the next step in the master plan study. The facility requirements analysis presented in the preceding section concluded that major airfield development such as a new runway, runway extension, or instrument landing system will not be needed. Thus, the focus of this chapter is on the development concept which will promote the orderly development of landside facilities.

BASIS OF CONCEPT DEVELOPMENT

The recommended development concept formulated in this task recognized a number of factors which included the facility requirements, FAA airport planning and design criteria, and other considerations such as "highest and best use", segregation of based fixed-wing aircraft and helicopters, and business aircraft. Since the evolution of the concept acknowledged these factors, it is believed that the future recommended development will result in a plan that will satisfy future aviation demand, accommodate demand safely, efficiently, and in conformance with FAA standards, and optimize the use of scarce airport land to increase revenues.

Facility Requirements

The development concept to be formulated must satisfy the long-range facility requirements to accommodate future aviation demand. While the subject of this chapter is focused on a landside development concept, the facility requirements analysis did identify a number of airfield improvements that would enhance the safety and efficiency of aircraft operations. The specific airside requirements that were determined and which will be included in the overall phased development program prepared as part of this master plan are:

- Widen Runway 8R-26L to 100 feet. FAA criteria calls for a minimum width of 100 feet for precision instrument runways for the class aircraft (Airplane Design Group II) that operate at the Airport. The present runway width is 75 feet.

- Add an angled exit taxiway on the north side of Runway 26R located in the vicinity of the control tower. This would facilitate the exit of aircraft from the runway.

- Widen substandard taxiways to meet standards. The different taxiways vary in width from 25 to 150 feet. FAA taxiway design criteria requires 35 foot wide taxiways to meet standards for airport reference code (ARC) B-II. The South Taxiway and portions of Taxiway C and F will require widening.

- Add a holding apron at the west end of the North Taxiway which would provide an area for aircraft holding for departure and run-ups on Runway 8R outside the runway

protection zone for Runway 8L.

- Install PAPI systems on each end of Runway 8L-26R and light the runway for nighttime operations.

The results of the analysis of landside facility requirements are summarized in the Table 6-1 which presents for each landside element, the amount of existing facility, the required amount, and the deficiency or surplus. A quick assessment of needs can be made by comparing the existing aircraft storage facilities to forecast demand.

As seen in Table 6-1, there are a total of 424 tie-downs and 260 aircraft storage hangars that provide an existing capacity for 684 aircraft. The forecast of based aircraft for the year 2010 projects 622 aircraft. This implies that the existing facilities at the airport are capable of accommodating future demand which suggests that all undeveloped land at the Airport is surplus and that the future needs (plus a contingency of about 10 percent) are met. However, it has been noted that tie-downs are under utilized and the facility requirements analysis indicates a need for 135 additional T-hangar spaces, plus additional conventional hangar space for storage of larger, more sophisticated business aircraft and helicopters. Due to the surplus of tie-down area, it appears that additional hangars can be constructed on portions of existing apron in order to conserve undeveloped land for aviation or other use. This will increase the revenue generated from presently developed areas.

Table 6-1
SUMMARY OF LANDSIDE FACILITY REQUIREMENTS

Facility	Existing	Required	Deficiency (Surplus)
Terminal	10,800 SF	11,270 SF	470 SF
Transient Apron	23,500 SY	26,100 SY	2,600 SY
	61 tie-downs	61 tie-downs	0
Tie-downs	131,800 SY	69,575 SY	(62,225 SY)
	363 tie-downs	207 tie-downs	(156 tie-downs)
T-Hangars	260 spaces	395 spaces	135 spaces
Conventional Hangars	0	58,320 SF	58,320 SF
Maintenance Hangars	33,400 SF	46,650 SF	13,250 SF
Auto Parking	340 spaces	299 spaces	(41 spaces)
ARFF	1 building[1]	1 building	0
Airport Maintenance	0	1 building	1 building
Fuel	30,000 gallons	36,000 gallons	10,000 gallons[2]

Source: P&D analysis.

[1]Building for ARFF vehicle is presently used as airport maintenance building.

[2]Recommended fuel storage to be added exceeds requirement to provide sufficient capacity for minimum fuel delivery of 9,000 gallons.

Airport Design Standards

Airports must be planned and designed in compliance with FAA standards to promote safety of operations. The design criteria of prime concern in formulating the future development concept at Brackett Field are FAA standards that specify separations and setbacks, runway protection zones, and critical areas for navaids. The restrictions imposed by these limits the land and areas available for future development. The principal standards upon which the development concept is based are discussed below.

The ***building restriction line (BRL)*** identifies suitable building locations on airports. The criteria that has been adopted for this plan is based on a BRL located 250 north of Runway 8L-26R. On the south side of the Airport the BRL consists of the present BRL for the area from the terminal building to the east to the Ranger hangar. East of the Ranger hangar, a BRL that is separated from Runway 8R-26L by 500 feet is assumed with a minor deviation around the existing Pomona Police Department hangar. The ***aircraft parking limit line (APLL)*** is established 44.5 feet north of the parallel taxiway serving Runway 8L-26R. This being the setback specified for a taxiway centerline to fixed or movable object for Airplane Design Group I aircraft. On the south side of the Airport the APLL coincides with the BRL for that portion from the terminal building to the Ranger hangar. East of the Ranger hangar an APLL separated from the Runway 8R-26L centerline by 400 feet is applied. The ***runway protection zone (RPZ)***, formerly clear zone, is an area at ground level that provides for the unobstructed passage of landing aircraft through the above airspace. The RPZ begins 200 feet from the end of the runway and has a size which varies with the designated use of the runway. The sizes of the RPZ at Brackett are as follows: Runway 26L is 2,500' by 1,000' by 1,750'; Runway 8R is 1,000' by 1,000' by 1,100'; and, Runways 8L and 26R are 1,000' by 250' by 450'. There are also ***critical areas*** associated with the navaids on the airport which are essentially areas in the vicinity of navaid antennas that must be clear to insure the continuous integrity of the navaid signal. The clearance for the glide slope is the critical area of prime consideration in the case of the concept development for Brackett Field. It precludes any development of undeveloped airport property east of the glide slope antenna along Puddingstone Drive. As previously discussed and shown in Section 5, these criteria limit the areas of development on the Airport.

Other Considerations

The formulation of the development concept also considered factors such as opportunities and constraints unique to the Airport, and demand for certain facilities. Opportunities of the site include highway exposure and road frontage and proximity to new office/industrial development. Constraints include limited area for development due to size of the airport and restrictions imposed by FAA separation and other criteria, a 100-year floodplain on the west side of the airport property, poor ground access and terrain limitations at certain areas of the Airport.

The Airport is bordered on three sides by roads - Puddingstone Drive on the north, Fairplex

Drive on the east, and McKinley Avenue (the airport access road) on the south. Since road frontage increases the revenue potential of land, it was a goal of the conceptual development to preserve, when possible, undeveloped airport land with frontage for potential non-aeronautical use. The strategy was to develop interior portions of parcels with road exposure for aviation facilities while retaining the frontage property for uses that can avail of the opportunity. In this manner, it is believed that it will be possible to maximize airport revenues without compromising facilities to accommodate aviation demand.

An aviation activity that has shown significant growth at Brackett Field and other Southern California airports is helicopter, primarily training, operations. Many helicopter operators currently exist at the Airport, and some operations conflict with fixed-wing aircraft activities. Additionally, some helicopter areas are not visible from the control tower. The establishment of a separate helicopter area, to serve as the central location for helicopter activity, offers the opportunity to segregate fixed-wing aircraft from helicopters and alleviate operational problems, and has been included as a feature of the future development concept. Noise emissions from light helicopters generating most of the rotorcraft traffic at the Airport have little impact on the airport noise contours. However, some strategies exist to mitigate potential disturbances to residential neighbors of the Airport. These would include an examination of existing flight patterns to minimize impacts on residential areas, and encourage the use on new technology aircraft such as NOTAR. Changes to flight patterns would require that procedures be developed with cooperation from the FAA control tower personnel and coordinated with the aircraft operators.

Business aviation is the largest and fastest growing segment of general aviation, with the primary aircraft missions being to transport business people. There are also other uses of business aircraft such as product demonstration, charter, intercompany mail, interplant shuttle, and shipment of equipment and parts. Since it is a significant segment of the GA industry, the development concept for Brackett was guided by the need to provide business aviation facilities, and dedicate one area, if possible, to serve this function. The type development in this area would include but not be limited to individual corporate hangars, a major FBO, or an executive hangar concept that provides storage, office and shop space to a number of tenants.

It is noted that there have been plans in the past few years to develop an office building on approximately one acre of airport land adjoining the main automobile parking lot for the terminal/administration building. The use of this parcel as originally proposed is retained in the development concept since it will stimulate income for the Airport and is not critical for the accommodation of aviation demand.

RECOMMENDED DEVELOPMENT CONCEPT

Figure 6-1 graphically presents the general concept for development of Brackett Field. This will be refined further in the final facilities planning analysis, to be addressed in Section 7. It is proposed to provide additional T-hangars on existing apron in the northwest corner of the site, near the Mt. SAC facility. An approximate 5 acre area has be devoted for use as

a helicopter center to the east of the control tower along Puddingstone Drive. This location provides an area for helicopters separated from fixed-wing aircraft facilities and is also conveniently located with respect to the new business center across Puddingstone Drive. The business center could be a source of users of the helicopter area, particularly itinerant operations by business aircraft. A landscaped treatment is envisioned along Puddingstone and Fairplex Drives to provide a visual buffer.

The County agrees with concerns on landscaping and is committed to the beautification of the Airport. The County will landscape as development takes place on different parts of the Airport, as opposed to an overall landscape project. The County will undertake this as projects are proposed and submitted by developers, and will require landscaping as part of the projects, especially along Puddingstone and Fairplex Drives.

Executive type hangar development is proposed for the southeast corner of the Airport. The type hangars envisioned for this area could serve either business aircraft or single engine non-business aircraft. The major portion of the parcel fronting on Fairplex Drive and McKinley Avenue is recommended for aviation or other development that is compatible with airport operations.

There is space available along the access road to Brackett Radio and the Pomona Police hangar for the development of sizable conventional hangar facilities. These buildings would be suitable for use as FBO or corporate hangars. Since the area already accommodates similar hangar facilities, the development of this area of the airport for business aviation is a logical evolution. The two existing County T-hangars to the west of this area along the airport access road are shown as ultimately being replaced and reoriented in a north-south configuration. As previously stated, the former plans for development of a non-aviation use on approximately one acre near the existing main auto parking lot have been retained in the recommended concept. Specifics on each of the different areas summarized above are presented in the following subsections.

Northwest Area Development

Existing development in the northwest corner of the Airport will continue - namely a mixture of FBO, Mt. SAC, and aircraft storage (both tie-down and T-hangars). As previously stated, the vacant 12 acre parcel in the northwest corner is the site for a proposed facility by the County Sheriff's Department Aero Bureau. Such a use is compatible with the overall development plan for the Airport. The general layout for the area is presented in Figure 6-2. It should be noted that the Mt. San Antonio College lease area depicted does not reflect an option for approximately 1.4 additional acres. Should the College decide to exercise the option, it would extend to the south.

Future Helicopter Area

Approximately 5 acres of undeveloped airport land along Puddingstone Drive has been designated for use as the future helicopter area. It is planned that this area would serve as

a central area for based and transient helicopter storage and servicing. This site has been selected because of its size and location. The location is preferred since it provides a separate area on the airport that is buffered from other areas, and thus conflicts between fixed-wing and rotorcraft will be minimized. Additionally, the proposed helicopter area will be conveniently located with respect to a main entrance of the new business park off Puddingstone Drive.

The location of the helicopter area as shown on Figure 6-1 is dictated by the aircraft parking limit line (APLL) and the Airport Surface Observation System (ASOS) planned adjacent to the existing glide slope antenna. A group of ASOS ground sensors will be located in an area behind (west of) the glide slope in an area extending approximately 38 to 75 feet from the present glide slope antenna. The helicopter area as shown has been located to accommodate 15 feet of clearance from the ground sensors and to provide approximately 5 acres of area. This considers the parcel's depth resulting from the limits imposed by the existing property line and APLL.

As part of the planned ASOS, the existing radio beam ceilometer will be relocated to the area of ground sensors, and therefore will not conflict with the helicopter area. However, the existing remote transmitter antennae and building along the fence on Puddingstone Drive will need to be relocated to clear the area for development as the helicopter area. Relocation to the south side of the airport near the airport rotating beacon appears to be a possible new location for the remote transmitting equipment.

Assuming 3 acres of apron, 1 acre of auto parking, and 1 acre of hangar area, the following helicopter demand would be satisfied:

- Aircraft parking - 25 aircraft
- Storage hangars - 24 aircraft
- Auto parking - 100-125 spaces

As seen above, approximately 50 helicopters could be accommodated and it is noted that the long-range (year 2010) forecast of based helicopters predicts a total of 23. Hence, the 5 acre helicopter area would more than satisfy the long term requirements for helicopter facilities.

Southeast Area Development

There is approximately 11 acres of undeveloped land located at the corner of McKinley Avenue and Fairplex Drive. It is recommended to use this area for a mixture of aviation and other uses with the intent to use the interior portion of the parcel for aviation use and the exterior portions and land fronting on the roadways for aviation related or other use. The option could be retained to develop the exterior portions in an aviation use should a proposal be submitted by a prospective tenant.

Two rows of Executive and T-hangars totalling 32 spaces (42,212 SF) and arranged in a

north-south orientation are sited in this area as shown in Figure 6-3. An additional two rows with 32 more spaces can be phased at a later date. The County is currently negotiating with a tenant to develop the two western rows of hangars shown in Figure 6-3. The placement of hangars as depicted will require the relocation of some existing Port-a-Ports and eliminate approximately 70 tie-downs. There are 18 Port-a-Ports located in this area, some of which will have to be relocated. This does not appear to pose a problem due to the mobility of the units. A possible site for relocation could be the northwest apron where it would be possible to line up to 13 units along the apron. If necessary, the remaining units could be maintained in the southeast area of the Airport, or on an interim basis along the fence south of the T.N.G. hangar.

The vacant parcel at the airport entrance may be used for either aviation or other use. Expansion of the type of development in the Business Park would be one possible use. Other uses have also been discussed in the past. It should be noted that if the area was developed with conventional bay-type hangars, (as there has been recent interest expressed to the County), then conventional hangar development recommended elsewhere in the plans could be converted to other type hangars such as T-hangars. Specifically, this would be possible in the area south of the hangar occupied by T.N.G Helicopters. This area is presently designated to accommodate two conventional hangars, but the site could accommodate two rows of 8-unit T-hangars in an east-west orientation. Thus, there is a range of development possibilities maintained in the plan which increases potential for the Airport to generate additional revenues. Development of a high quality FBO that caters to the business aircraft operator would be an asset to the Airport, attractive and convenient to nearby businesses, and consistent with local plans for attracting new business activity.

Business Aircraft Area

The facility requirements analysis indicated the need for some 58,000 square feet of conventional, bay-type, storage hangars to accommodate the larger, more sophisticated business aircraft and helicopters. Four large conventional hangars are located in the southeastern part of the airport near the business park. There is space available to construct additional conventional hangars in this area. Figure 6-4 presents a plan whereby three 21,000 SF hangars are located on the site. Access and auto parking are provided by the existing access road to this area off of McKinley Avenue. The grouping of modern, conventional hangars in one general location will promote the identification of the area as the business aviation area. The construction of a hangar in between two existing hangars as shown in Figure 6-4 would most likely eliminate approximately 22 existing tie-downs.

The facilities developed in this area could be owned and/or operated by a major full service FBO, an individual business aircraft operator or flight department, aircraft management company, or a hangar rental FBO. Regarding the latter there are several examples around the country where a corporate hangar has been developed to accommodate multiple tenants. In this concept, hangar space, offices and shop areas are leased to different aircraft operators who might prefer to rent space for their aircraft and aviation department as opposed to investing in the construction of their own facilities.

Redevelopment of Existing T-hangars

The County owns two rows of T-hangars along McKinley Avenue near Pomona Aero Center which date to the late 1960s. The long-range plan for this area calls for the replacement of these facilities when they have reached their useful lives which is assumed to occur during the 20-year planning period of this master plan. However, when replaced, the T-hangars should be reoriented in a north-south direction as shown in Figure 6-5. The rearrangement of the T-hangars will allow for development of two rows of 26-unit structures, plus open up room for additional T-hangar development near the existing automobile parking lot for this area. The area identified for the two 26-unit structures is traversed by an MWD easement. Therefore, these portable T-hangar units are recommended for these two structures. Sufficient space is available on the site to also develop two rows of 12-unit T-hangars. The development as shown will eliminate approximately 25 existing tie-downs. Since this concept calls for the replacement of existing hangar facilities, it suggests that the timing would be deferred until later in the planning period.

The existing apron west of the Pomona Aero Center near the fueling island is dedicated for use as the transient apron in the recommended concept. As shown in Section 5, the present tie-down configuration in this area will accommodate the number of daily transient aircraft predicted for the airport in 2010. Overflow transient parking will be available north of the terminal building and should also be anticipated at future facilities developed in the Business Aircraft and Helicopter areas.

CONCLUSIONS

The results of the concept development indicate that the long-range aviation facility requirements can be accommodated together with development of certain areas of the Airport for non-aeronautical use. Other areas of airport property remain undeveloped in the concept. These areas may be developed for aviation or other use depending on the suitability of and demand for the individual sites.

Aviation Facilities

As stated at the outset of this chapter, the need for additional hangar space and the large amount of unused aircraft tie-downs were two prime considerations in the formulation of the development concept. The concept as presented allows for the construction of hangar space to serve long range demand, yet maintain flexibility and options for undeveloped areas. A total of 100 new hangar spaces have been shown in the concept, versus a calculated requirement for 135 storage spaces. A total of 93,000 SF of conventional hangar space has been shown possible to site on the Airport, compared to a calculated requirement of 71,570 SF of additional conventional storage and maintenance hangar space.

It is noted in the discussions on different areas of the Airport that some proposed hangar development requires the use of existing tie-down spaces. The facility requirements analysis indicated a surplus of 156 tie-down spaces. A total of approximately 115 tie-downs have

been absorbed by proposed hangar development and approximately 25 new based aircraft spaces are provided in the proposed Helicopter Area for a net reduction of 90 tie-downs. In summary, future aircraft storage capacity in the form of hangars and tie-downs exceed the projected long range demand.

Undeveloped Parcels Remaining On-airport

The recommended development concept as shown above is capable of providing facilities in excess of the long-range (20 year) requirements and provides for the orderly development of the Airport. A reasonable amount of existing apron area has been utilized for hangar space, without compromising long-term apron requirements, which has resulted in certain parcels of airport land remaining unused in the conceptual analysis. This subsection addresses these parcels and potential strategies for future use.

The primary parcel of undeveloped land in the recommended concept is the 12 acre northwest parcel. This land is the proposed site for the L.A. County Sheriff's Department Aero Bureau which will relocate from existing facilities at Long Beach Airport. The site has good taxiway access to the airfield and development for the Aero Bureau is consistent with goals of the master plan.

Approximately 2.5 acres between the control tower and proposed helicopter area remains unused in the development concept. The parcel has high revenue potential due to frontage on Puddingstone as well as excellent central taxi access to the airfield. The parcel may be developed as aviation or related use. Aviation uses could include based aircraft storage, small FBO or inclusion within the helicopter area.

There is a substantial area of raw land southwest of the airport administration building across the airport access road. The parcel encompasses approximately 7.5 acres but would be difficult to develop due to terrain and less desirable than other locations due to limited road frontage. The airport rotating beacon is presently located on this parcel. The site appears to be suitable for accommodation of the remote transmitter (RT) antennae and equipment. These are recommended for relocation in order to allow development of the helicopter area and preliminary indications show this location may have some favorable attributes as the RT site.

Across the airport access road there is approximately one acre of undeveloped land between the road and administration building parking lot. There were recent plans for an office building on this parcel which never materialized. The parcel is not required for aviation use and thus non-aviation development may be allowed to increase airport revenues.

The last remaining parcel that is not used in the development concept is a wedge of approximately one acre located in the northwest corner of the Airport and formed by the flood channel and Puddingstone Drive. This parcel is separated from the airport by the flood channel and the shape of the lot limits the potential uses. The area is near to the Mt. San Antonio College and could provide additional auto parking for the facility. Potential

development of a small hangar and apron would be possible but would require bridging the flood channel to permit airfield access.

PHASING ASPECTS

It must be remembered that the development concept as described will be implemented in stages over a 20-year planning period. Aviation facilities will be constructed to accommodate the actual demand in the future and will also depend on the availability of funds from the public and private sectors. The ultimate phased development plan will be detailed in the next phase of the master plan, however, a discussion on the possible phasing, in concept, is included. The recommended development in this master plan will be phased in three time periods as follows: the short-range or Phase I (1992-1995); the intermediate-range or Phase II (1996-2000); and, the long-range or Phase III planning period (2001-2010).

Phase I development would include initial development of the helicopter area, development of hangars in the business aviation area, and development of two Executive hangars in the southeast corner. The facility requirements analysis indicated a need for 76 additional T-hangar spaces in the short-range. Development of hangars as shown for this area will provide 32 hangar spaces and thus meet a part of the hangar requirement. The level of demand for additional hangars can also be ascertained after the 32 units are built. Additional hangar development called for in the plan may be accelerated as demand dictates. Construction of part of the helicopter area and hangar development in the business aviation area is also envisioned in the first development phase.

Phase II development involves continued expansion and possible completion of the helicopter area, continued phased development of the business aviation area, and construction of two additional hangar rows in the southeast corner of the Airport. In the long-range (Phase III), hangar development in the business aviation area is completed. Redevelopment of the two south County T-hangars occurs in this phase as the buildings are expected reach the end of their useful lives. The timing of this redevelopment could be sooner and would depend on maintenance requirements of the buildings and prospective developers/lessees.

Section 7
Airport Plans

INTRODUCTION

This section, Airport Plans, is intended to detail the total 20-year development program, as recommended by this Master Plan, for Brackett Field. The design of the airport system as described herein is based upon the facility requirements discussed in Section 5 and the recommended development concept presented in Section 6. This airport development program is intended to integrate existing facilities and improvements needed over the next twenty years, as addressed in this section, within the framework of an implementation schedule.

This section is comprised of a text discussion and accompanying graphics, some of which are reductions of the large-scale plans prepared during the course of this Study, that graphically depict the recommended development plan for Brackett Field. The overall development plan for the Airport is depicted on the Airport Layout Plan (ALP). The ALP is a graphic presentation of existing and ultimate airport facilities and is a key document that serves as a reference of aviation requirements, as well as land use and financial planning. In order to receive federal funding assistance, proposed projects must be consistent with the ALP, and thus the ALP must be revised and periodically updated. The ALP also indicates the recommended phasing of airport development projects.

It should be noted that many development recommendations contained in this report and indicated on airport plans are based upon projected traffic levels and attainment of these levels. It cannot be over-emphasized that where development is recommended based upon demand or traffic levels, it is ***actual***, not forecast, demand that dictates the timing of construction. However, for planning purposes, a schedule must be provided and this schedule is based upon the forecasts of traffic presented in Section 4.

It is also important to point out that the schedule of improvements proposed in this plan is contingent upon the availability of Federal, State, and local funds, and investment from the private sector. While improvements are scheduled for specific years in this report, it must be remembered that it is the programming of the Airport Improvement Program by the FAA that will determine the timing of many projects. Development projects at Brackett Field must be reconciled with development priorities of other airports in the region. The implementation of projects will then depend on the availability of funds and FAA programming, as well as attainment of activity levels.

In accordance with an agreement between the County and City of La Verne regarding consistency of new development at Brackett Field with the City's General Plan, the County agreed that it will in good faith involve the City and the City agreed to participate in the development of any proposed Master Plan for the airport in recognition of the City's interest in the nature of the future planning of undeveloped areas of the airport, particularly as these areas are adjacent to and visible from City regulated properties. However, as airport sponsor, the County retains principal permitting authority for proprietary airport development. It should also be noted that under federal law (Federal Aviation Regulation Part 77, Objects Affecting Navigable Airspace), proposals for new development or

alterations off-airport may require notification to FAA for review of possible airspace impacts.

In addition to the ALP, a number of other drawings are included in the set of plans prepared as part of this master plan. These are the Airport Airspace Plan, Runway Protection Zone Plan, Building Area Plan, and Airport Land Use and Access Plan. Further detail on these plans is the subject of individual subsections.

ROLE OF THE AIRPORT

Before presenting the recommended development and airport plans, it is appropriate to briefly discuss the role of the Airport. To begin, the Airport is presently designated by FAA in the National Plan of Integrated Airport System (NPIAS) as a general utility airport which is defined as an airport that is designed to serve all airplanes classified by FAA as Aircraft Approach Category A and B. These are aircraft with approach speeds of up to but not including 121 knots. Runway length and instrumentation separates utility airports into basic and general classes. Since Brackett Field is capable of accommodating large aircraft (airplanes more than 12,500 pounds) and is equipped with an instrument landing system (ILS), the Airport is categorized as General Utility - Stage II (GU2). The future role of Brackett Field is envisioned to continue as GU2.

Another role of Brackett Field is that of a ***reliever*** airport. The function of this type of airport is to provide adequate facilities to relieve congestion at commercial service hub, or primary, airports so that they can accommodate additional scheduled service activity. Reliever airports, as the name implies, fill a key role in relieving capacity constraints at the primary airport by spreading general aviation aircraft operations to nearby airports. Brackett is designated a reliever to Ontario International Airport. The FAA has forecast that the annual aircraft delays at Ontario will exceed 20,000 hours by the year 1998. Since general aviation is a significant portion of Ontario's traffic, approximately 27 percent, Brackett and other reliever airports in the area will play important roles in reducing congestion and delays at Ontario. While there are no planning standards specifically developed for reliever airports, generally speaking a reliever should be capable of accommodating all GA aircraft under all weather conditions as the primary airport that it is relieving. A significant aspect of the designation as a reliever is that the Airport is eligible to obtain funding assistance from an additional portion of the Airport and Airways Trust Fund, the prime financing vehicle for airport improvements. The FAA has earmarked 10 percent of available funds for reliever airports. This should improve the County's position in terms of receiving federal grants for Brackett through AIP.

The FAA in its current AC 150/5300-13, Airport Design, has developed an ***Airport Reference Code (ARC)*** which is a coding system that relates airport design and planning standards to two components: the operational and physical characteristics of aircraft operating at an airport. The coding system was more fully explained in Section 5, and as previously stated, planning standards specified for an Airport Reference Code of B-II will be used as guidance in developing the ALP for Brackett Field. This type of facility will accommodate larger

general aviation aircraft with wingspans up to 79 feet and approach speeds up to 121 knots. However, there may be cases where planning standards for a lesser ARC are applied due to operations of small aircraft on the short, parallel runway.

AIRPORT LAYOUT PLAN

The Airport Layout Plan, Figure 7-1, delineates the overall development plan for Brackett Field as recommended in this Master Plan Study and also indicates the phasing of the airport improvement strategy. The development phases used herein and throughout the report are as follows: the short-range or Phase 1 (1-5 years); the intermediate-range or Phase 2 (6-10 years); and, the long-range or Phase 3 planning period (11-20 years).

As a graphic overview of the recommended airport development, the ALP is supported by the other plans discussed in this section. The Airport Layout Plan conforms to guidelines set forth by the FAA for this preparation of this plan. The ALP is the principal plan depicting the recommended improvements and changes to the airport layout configuration and support areas. The recommended development program shown on the ALP is summarized below on a phase by phase basis.

Phase 1 Development

Phase 1, or short-range, development at Brackett Field encompasses the first five-year period (1991-1995) of the overall plan. The improvements discussed below are considered to be of the highest priority in the total development plan, but are coordinated with the remainder of the plan and are supported by findings reached during previous portions of the Study. The Phase 1 recommendations are outlined below.

- Widen Runway 8R-26L to a width of 100 feet to meet FAA standards for a precision instrument runway. This will require relocating existing runway edge lighting (MIRL) and VASI systems.

- Relocate existing Remote Transmitter antennae and equipment shelter to allow for development of Helicopter Area. Relocation to the south side of the airport on the hill near the existing Rotating Beacon is recommended. The final location will be determined by the FAA Airways Facilities Division.

- Construct an angled exit taxiway on the north side of Runway 8L-26R near the control tower. The taxiway should be designed for use by small aircraft (12,500 pounds and under) and will facilitate access to the north hangar area from the short parallel runway.

- Construct 6,400 SY of apron for use as tie-down, transient parking, and taxilane (for hovering) in the new Helicopter Area.

- Widen South Taxiway and Taxiway F south of Runway 8R-26L to 40 feet. Portions of the South Taxiway are only 25 feet wide and do not meet FAA taxiway standards of 35 feet. A width of 40 feet is recommended to conform to prevalent taxiway widths at the Airport.

- Construct Medium Intensity Approach Light System with sequenced flashers (MALSF) on Runway 26L.

- Construct 10,000 gallon underground fuel tank.

- Construct an airport maintenance/shop facility. This will permit the existing building to be used for its original purpose as storage for the fire truck.

- Construct 2,900 SY of auto parking in the new Helicopter Area.

- Construct 15,000 SF hangar and adjacent apron in Helicopter Area.

- Construct 21,000 SF hangar in Business Aircraft Area.

- Relocate existing Port-a-Ports. Some of the portable hangars located along the southeast apron should be relocated to allow for construction of Executive hangars as shown on the ALP. The need for space will dictate the number of portable units to be moved. Due to their mobility, the units may be relocated to any number of locations on-airport. A potential location for many of the hangars is along the northwest apron as previously shown in Figure 6-2. A temporary location in the short term could be the area south of the T.N.G. hangar.

- Construct two 16 unit hangar buildings in the Business Aircraft Area. This will be constructed on existing apron in the southeast corner of the airport. The total hangar space provided will be 42,212 SF.

- Automated Surface Observing System (ASOS)

During the preparation of the airport plans, it was announced that the Los Angeles County Sheriff's Department proposed to relocate the Aero Bureau Facility from its existing location at Long Beach Airport to a new site at Brackett. The proposed relocation is intended to provide the Aero Bureau with more helicopter landing and vehicle space, to reduce the Aero Bureau's operating costs, and to provide a central location in Los Angeles County for Aero Bureau operations.

The proposed site is the vacant and undeveloped parcel located at the northwest corner of the Airport. The project site will be purchased by the County for the Sheriff's use. A single building, two story concept containing approximately 65,000 SF is programmed for the Aero Bureau. This accounts for a maintenance hangar of 32,000 SF, maintenance shops of 22,500 SF, and on the second level, an administrative/operations area of 11,500 SF. The building

structure will utilize a steel-frame system with a total height of approximately 40 feet and a large, 80-foot wide by 400-foot long hangar area. Airside site requirements include twelve helicopter tie-down pads, two approach and takeoff areas, three fixed-wing parking areas, a taxiway connector, wash rack, and a paved exterior storage area. Landside site requirements include 116 automobile parking spaces, six fuel storage/liquid-waste tanks, a truck-receiving area and access roadways. Construction of the facilities is estimated to be completed by January 1994. The Sheriff's Department Aero Bureau estimates approximately 30 operations will occur daily, based on existing patterns at the Long Beach facility.

A major theme of the Phase 1 period is the development of the north side of the Airport. This includes development of the Sheriff's Aero Bureau facility and initial development of the new Helicopter Area to provide a central area, dedicated for rotorcraft. The existing Remote Transmitter will need to be relocated in order to permit development in this area of the Airport. Helicopter traffic has proliferated at Brackett Field in recent years and a separate area for helicopters will alleviate conflicts between fixed-wing aircraft and helicopters.

Another project recommended for Phase 1 is the installation of MALSF for Runway 26L. The runway is presently served by an ILS but is not equipped with an approach light system. This system is comprised of a series of lights extending 1,400 feet from the runway threshold (in this case the displaced landing threshold of 26L). Light bars are placed at approximate 200 foot intervals. Due to the displaced threshold, the first three bars would be installed as flush in-pavement lights on the runway. Installation of the system would require placement of two light bars on the County Fairgrounds. Based on available data it appears that the three light bars required at 1,000 feet from the threshold can be accommodated on airport property. The last two light bars are located on the County Fairgrounds and it appears that by varying the spacing between bars, within tolerances specified by FAA, it is possible to avoid conflicts with the drag strip in the Fairgrounds. The present landing minimums for the ILS approach procedure for Brackett are a ceiling of 320 feet above ground and one mile visibility. Visibility minimums may be reduced due to the installation of approach lights and FAA will determine if reduced minimums are possible at Brackett. It may also be possible at a later date to extend the MALSF system into a MALSR system, which basically involves an additional 1,000 feet of light bars.

It is further noted that there are existing plans by FAA for the installation of an Automated Surface Observing System (ASOS). This automated weather observation equipment will provide temperature, dew point, wind, and ceiling information. The precise timing of this system is uncertain and dependent on FAA Facilities programming. Present plans call for installations to begin in late 1993 and it will be assumed that the installation at Brackett will occur during Phase 1. Funding for the construction of the facility is completely provided by FAA. The maintenance costs will be the responsibility of the National Weather Service.

The ALP reflects a revision to the present Building Restriction Line (BRL) on the south side of the airport. The existing BRL is located 350 feet from the centerline of Runway 8R-

26L. The south BRL shown on Figure 7-1 maintains the existing line from the terminal building east to the Ranger hangar building. However, east of the Ranger hangar the BRL is set at 500 feet from the centerline of Runway 8R-26L with a minor deviation around the existing Pomona Police Department hangar. This offers enhanced protection from encroachment of buildings near the most critical runway end (i.e., the runway equipped with the ILS).

Phase 2 Development

Medium-range development, covering the five-year period 1996-2000, is depicted on the ALP as Phase 2. The following improvements are recommended during this period:

- Construct holding apron for departures on Runway 8R.

- Install Medium Intensity Runway Edge Lights (MIRL) on Runway 8L-26R. This project will greatly increase the utility of the runway during nighttime periods and as such will enhance capacity. Runway 26R would qualify for the installation of Runway End Identifier Lights (REIL), at present traffic levels, if the runway was lighted. Therefore, the runway lighting project should also include the installation of REIL on Runway 26R.

- Install Precision Approach Path Indicator (PAPI) system on Runway 26R.

- Construct a 15,000 SF hangar with associated apron, and expand parking apron in Helicopter Area. An additional 6,400 SY will be added during this phase and complete the helicopter parking development in the area.

- Construct two Executive hangar buildings providing 32 spaces, totalling 49,824 SF, in the southeast corner. The north ends of the buildings extend to the revised Building Restriction Line previously discusses. This will increase the number of hangar spaces and preserve land along McKinley Avenue and Fairplex Drive for aviation or related use. Possible uses other than aeronautical will serve two purposes. First, the land with road frontage will have high revenue potential and thus a maximum yield from the airport land would be realized in terms of income. Second, non-aviation development would serve as a visual buffer.

- Construct 21,000 SF conventional hangar in Business Aircraft Area.

- Expand auto parking in Helicopter Area.

In Phase 2, development of the Helicopter Area should be completed. Development of Executive hangars in the southeast corner of the Airport will also be completed during this phase of the airport development program.

Phase 3 Development

Development recommended under Phase 3, or the long-range portion of the plan, covers the final ten-year period considered during this Study, 2001-2010. As such, the improvements discussed below are considered to be of the lowest priority and implementation is recommended only if activity materializes as forecast in this Study. Recommendations for Phase 3 development consist of the following projects.

- Install PAPI - Runway 8L. It is noted that the timing of this improvement is based on the forecast of qualifying aircraft operations for the runway. It is further noted that this project would have noise benefits as it would assist aircraft approaching from the west in maintaining proper altitude which also will serve in providing maximum separation from existing residential development located in the hills northwest of the Airport. Thus, acceleration of the timing of this improvement should be considered should funding be available.

- Construct 21,000 SF conventional hangar in Business Aircraft Area. This will complete the hangar development in this area.

- Remove and replace two existing County T-hangars along McKinley Avenue. These hangars are among the oldest on the airport and date to the 1960s and are in fair condition. It is recommended to replace and reorient these buildings based upon the following rationale:

  - The cost to renovate and maintain old buildings in fair condition does not appear to be a cost effective approach. Provision of new facilities as opposed to rehabilitation would be more economical.

  - Reorientation of the buildings as shown on the ALP provides a more efficient use of land and will provide space for development of additional conventional hangar space. The north-south orientation shown accommodates two 26-unit T-hangars, plus two shorter rows of 12-unit buildings. The longer, 26-unit buildings should be portable units due to an MWD easement that traverses the area. The two smaller, 12-unit buildings can be located in the area to the west. These can be either portable or permanent structures.

AIRPORT AIRSPACE PLAN

The Airport Airspace Plan, presented as Figure 7-2, depicts the imaginary surfaces on and around Brackett Field through which no object should penetrate without being properly marked. The dimensions and criteria employed in determining these surfaces, as discussed below, are those outlined in the Federal Aviation Regulations, Part 77 Objects Affecting Navigable Airspace.

The ***horizontal surface*** is a horizontal plane 150 feet above the established airport elevation, which in the case of Brackett Field is 1,161 feet above mean sea level. The perimeter of the horizontal surface is delineated by arcs of radius 10,000 feet from the center of the instrument runway end (Runway 26L) and also from Runway 8R, and of radius 5,000 feet from the visual runway ends (Runways 8L and 26R). Adjacent arcs are connected by lines that are tangent to these arcs. Since the 5,000-foot arcs associated with Runways 8L-26R are encompassed by the 10,000-foot arcs of Runway 8R-26L, the former is disregarded in delineating the perimeter of the horizontal surface.

The ***conical surface*** extends outward and upward from the edge of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet. Thus, the elevation of the conical surface at its outermost edge is 1,361 feet above mean sea level.

The ***primary surface*** is defined as being longitudinally centered on the runway for a width dependent on the type of runway and extending 200 feet beyond each end of the landing threshold. The applicable widths for the primary surfaces at Brackett Field are 1,000 feet for Runway 8R-26L and 250 feet for Runway 8L-26R.

The slope and configuration of the various runway ***approach surfaces*** vary as a function of runway type, length, and availability of instrument approaches. A dual approach slope is utilized on a runway with a precision instrument approach, such as Runway 26L. This surface is 1,000 feet in width at its termination, 200 feet from the runway end, extending to 16,000 feet wide at its beginning point, 50,200 feet from the runway threshold. It rises at a slope of 50:1 from the primary surface for its last 10,000 feet and at a 40:1 slope for the remaining 40,000 feet. It should be noted that the approach surfaces emanate 200 feet from the physical threshold and not the displaced threshold. All other runways at Brackett have visual approach surfaces (20:1 slope).

For Runway 8R, the inner width is the same as the primary surface for the runway (1,000 feet). The surface extends 5,000 feet to an outer width of 1,500 feet. For both ends of Runway 8L-26R, categorized for FAR Part 77 purposes as a utility visual runway, the approach surface also extends for a distance of 5,000 feet, however, the inner width of the approach surface is 250 feet and the outer width is 1,250 feet.

The ***transitional surfaces*** extend outward and upward at right angles to the runway centerline (and runway centerline extended) at a slope of 7:1 from the edges of the primary and approach surfaces. Transitional surfaces for those portions of the precision instrument approach surface, which project through and beyond the limits of the conical surface (approach to Runway 26L) extend for a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the extended runway centerline.

Presently there are obstructions in the approaches of Runways 8R and 26L. Obstructions are most numerous in the approach to Runway 26L. These consist of poles and trees and occur from distances of 200 feet to approximately 4,300 feet from the runway threshold.

Obstructions to Runway 8R are close-in and consist of terrain and vegetation. The controlling obstacle that dictates the present landing minimums is a pole with an elevation of 1,390 feet MSL, located at 34° 6' 3" latitude and 117° 40' 11" longitude. The Runway Protection Zone Plan, discussed in the following subsection will provide details on the innermost portions of the approach surfaces described above.

In order to control the future construction of obstacles which may hamper the safe operation of aircraft operating at Brackett Field, it is recommended that this Airport Airspace Plan be incorporated in the zoning ordinances of the municipalities surrounding the Airport.

RUNWAY PROTECTION ZONE PLAN

A major consideration in the regulation of off-airport land use is the height of tall structures in relation to the approach and departure surfaces for the runways, particularly the innermost portions of the surfaces, or those that are nearest the runways. The absence of appropriate controls can lead to the establishment of tall structures such as antennae, smoke stacks, etc. which are penetrations to the avigational surfaces described in FAR Part 77.

Figure 7-3, Runway Protection Zone Plan, presents large scale plan and profile views of the runway protection zones at Brackett Field.

It should be noted that the runway protection zones for the short runway at Brackett (Runway 8L-26R) are encompassed by either the runway protection zones or imaginary surfaces of Runway 8R-26L. The RPZ and imaginary surfaces of the longer runway are more restrictive and control those of the shorter runway, and thus in the depiction of runway protection zones only those associated with the longer runway are considered. Therefore, plans and profiles of the approaches to Runways 8R-26L are only shown on Figure 7-3.

A total of 31 natural and man-made objects are shown on the plan and were obtained from the Airport Obstruction Chart (OC) published by the National Oceanic and Atmospheric Administration (NOAA). While these are obstructions since they penetrate FAR Part 77 imaginary surfaces, they do not pose hazards to aircraft operations. Therefore, treatment of the obstructions is not required, however, should the chance for future obstruction treatment and/or removal arise, the County should avail of the opportunity.

It is noted that the RPZ for Runway 26L contains numerous poles in the County Fairgrounds that are obstructions. The Runway Protection Zone Plan proposes the installation of obstruction lights on two of the poles with the greatest penetration of Part 77 surfaces. These are identified as obstruction numbers 22 and 24 on the plan. The final placement of obstruction lights will be the responsibility of the Air Traffic Division of FAA.

BUILDING AREA PLAN

The Airport Layout Plan shows the overall ultimate development for the Airport while the Building Area Plan, Figure 7-4, illustrates the landside improvements in greater detail.

Landside development at Brackett Field exists on both the north and south sides of the airfield and Figure 7-4 focuses on these building areas. The arrangement of conventional hangars, T-hangars, and support buildings is suggested and it should be noted that the siting of these facilities is subject to further engineering investigations and as such may be modified.

North Side Building Area

The existing north side development includes Mt. San Antonio College, numerous T-hangar buildings, an FBO (Runway 3-7), and the FAA control tower. New landside facilities proposed in this area include development of the helicopter area, and a new facility for the Sheriff's Department Aero Bureau.

A major development recommended on the north side is the Helicopter Area. Development is proposed to commence in the first development phase and continue in phases, and will include construction of apron for based and transient helicopters, hangar and auto parking. Since the hangar construction costs will presumably be borne by a future private operator, the final size and site arrangement are subject to the developer's personal plans and requirements. However, the plan depicts a simple layout for the area reflecting a total of 2 acres of apron area, one acre of auto parking and two 15,000 SF hangars. Specific considerations of the site include provision of adequate clearances from the existing glide slope antenna and an Automated Surface Observation System (ASOS) presently planned by FAA to be sited behind (west of) the glide slope antenna. In order to develop this area it will be necessary to relocate the existing remote transmitter antennae and building from the present site next to the fence along Puddingstone Drive.

As previously described, the County Sheriff's Department Aero Bureau proposes to construct a facility in the northwest corner of the Airport to serve as a base for Bureau operations. This use of the parcel is compatible with the overall airport development plan.

South Side Building Area

The present south side development includes the Brackett Air Business Park, a group of four conventional hangars north of the Business Park, T-hangars, an FBO (Pomona Aero Center), the fuel island, Airport Administration Building, airport maintenance building, and an avionics repair company (Westair Instruments). New development on the south side involves new T-hangars, conventional hangars, expanded fuel facilities, and airport maintenance/shop building. Certain parcels may be used for aviation or related uses.

Executive hangar development is proposed for the southeast corner of the Airport. Four hangar buildings providing 64 individual hangar spaces are planned and will require relocation of some existing portable hangars and use of some existing tie-down spaces on the southeast apron. The development of these hangars is scheduled over the first and second phases of the planning period. The land along Fairplex Drive and McKinley Avenue may be developed for a commercial/industrial or small office use. The road frontage and

access offers a higher revenue potential than the interior portion of the parcel and thus a strip of land can be reserved for such uses. The option to develop the parcel as an aviation use is also maintained.

The existing hangar area to the west has been designated as the Business Aviation area of the Airport. Conventional hangars are proposed to be developed in phases in this area to support business aviation operations such as FBO, corporate flight department facilities, aircraft management companies and air taxi operators.

The two existing rows of County owned T-hangars along McKinley Avenue are recommended to be replaced and rearranged in a north-south direction. This is shown on the Building Area Plan for Phase 3, which is based on the assumption that the existing hangars (which date to the 1960s) will be used as long as possible before maintenance costs become prohibitive. The reorientation of hangars will more efficiently utilize existing land and also will free space for the development of two 26 unit structures, and two smaller 12 unit T-hangar buildings to the west. As previously mentioned, due to an existing MWD easement traversing the area, the two 26-unit buildings should be comprised of portable T-hangar units.

The existing tie-downs west of this area are planned as the transient aircraft parking apron. An additional 10,000 gallon fuel storage tank is recommended during Phase 1. Further to the west, next to the Westair Instruments building, an airport maintenance/shop building is recommended. The maintenance building is recommended for Phase 1 and will permit the existing building to serve its original function as storage area for the fire truck.

Approximately one acre of undeveloped land between the airport access road and main airport parking lot is not required for aviation use and can be developed into a commercial/industrial/office use.

AIRPORT LAND USE PLAN

The total acreage of the Airport will remain at 257.5 acres. Figure 7-5 presents the Airport Land Use Plan which serves as an overview of the use of different sections within the Airport boundary. The land uses depicted on the plan have been broken down into the following categories, airfield, aircraft storage, Helicopter Area, Business Aircraft Area, transient apron, airport terminal/administration area, ancillary leases, and vacant. The areas shown on Figure 7-5 should be regarded as general with the purpose of providing an overview of development on-airport.

The ***airfield area*** includes the aircraft operating areas (runways/taxiways), runway protection zones, and navaid critical areas, and basically is comprised of all area within the Building Restriction Lines. The airfield area encompasses approximately 150 acres.

Aircraft storage areas have been designated on the plan and represent hangars and tie-down areas. Also included in these areas are FBOs. There are three aircraft storage areas

depicted on Figure 7-5 totalling some 44 acres. The largest (25 acres) is located on the north side of the airfield and includes existing and future T-hangars and existing tie-downs. Another area is designated as aircraft storage on the southeast corner of the airport. This area totals approximately 9.3 acres. The last aircraft storage area (9.9 acres) is the section that includes Pomona Aero Center and auto parking, the two County T-hangars ultimately recommended for replacement, and the Ranger Hangar building.

The ***Helicopter area*** encompasses roughly 5.5 acres along Puddingstone Drive. It is intended to cater to based and transient helicopter operators as a terminal area. Aircraft operations will be conducted on the airfield - either on the runways or designated helipad(s).

The ***Business Aircraft Area*** is comprised of approximately 9 acres of existing hangars and areas recommended for new hangars. The existing tenants in this area include Brackett Aircraft Radio, Air Vision and the Pomona Police Department.

The ***transient apron area*** will total approximately 5 acres and is comprised of existing tie-downs near the aircraft fuel island and airport administration building. The ***terminal/administration area*** is adjacent to the transient apron and includes the airport administration building, main parking lot and public viewing area, airport maintenance building and proposes ARFF building. This area totals 3.5 acres. Three areas are designated as ***ancillary lease areas*** which pertain to Mt. San Antonio College, FAA (control tower), and Brackett Air Business Park. These areas total about 5 acres.

The remaining areas on airport are designated as ***vacant*** on Figure 7-5, and can be developed as aviation or other related uses such as those of the ancillary leases. The main vacant parcel is a 12 acre tract at the northwest corner of the Airport. This has been the subject of on-going discussions as the site of the aviation facility for the County Sheriff's Department. Such a use would be compatible with this master plan. A second, smaller vacant parcel on the north side of the Airport is located in between the control tower and Helicopter Area. This could conceivably be absorbed into the ultimate Helicopter Area or could be developed into another aviation or related use. Approximately 9.5 acres in the southeast corner of the Airport along McKinley Avenue and Fairplex Drive is left vacant, as shown on Figure 7-5, and can be either be developed as a pure aviation/airport use or commercial/industrial or a use similar to the adjacent Brackett Air Business Park which predominantly houses aviation related businesses or other business with the need to be located on an airport. Approximately one acre next to the main parking lot for the terminal building can be developed as non-aviation use, such as the prior plans for a small office building. Immediately south, across McKinley Avenue, there is approximately 7.5 acres of steeply sloped, undeveloped land. The area is shown as vacant, but noted as the site for the existing airport rotating beacon, and new site for the relocated remote transmitter antennae and equipment shelter. Two smaller parcels of land that remain vacant are a 1.3 acre parcel along Puddingstone Drive but separated from the Airport by a flood control channel and a one acre area on the west end of the Airport, beyond the RPZ of Runway 8R. The latter

offers little potential due to its location with respect to the runway end, access and shape and should be preserved in its present undeveloped state.

ACCESS PLAN

Figure 7-6 presents the Access Plan which shows the principal access routes to the Airports and principal freeways in the airport vicinity. The Airport enjoys excellent ground access to Interstate 10 (San Bernardino Freeway), which is approximately 2 miles to the south, Interstate 210 (Foothill Freeway), State Highways 57, 60 and 71, all limited access highways.

Also shown on the Access Plan is the Route 30 Corridor which is a proposed 28-mile transportation facility generally between the existing Route 30 interchange at Route 66 (Foothill Boulevard) in Los Angeles County and Interstate 215 (I-215) in San Bernardino County. The Route 30 Corridor would serve regional east-west traffic movement in the eastern Los Angeles County and western San Bernardino County areas. The Corridor traverses the communities of La Verne, Claremont, Upland, Rancho Cucamonga, Fontana, Rialto, and San Bernardino. The extension of Wheeler Avenue, just north of the Airport, is also shown on Figure 7-6.

Section 8
Financial Plan

INTRODUCTION

This section represents a financial plan to provide information in support of implementation decisions, and to serve as a guide for orderly development according to the Brackett Field Master Plan, as discussed in previous sections of this report. It identifies the actions required, their logical sequencing, and the financial obligations to be assumed by Federal, State and local government. The financial plan consists of three basic elements - the capital improvement costs associated with recommended development, the staging of development and improvement costs, and the identification of sources of funds for implementation of the overall development program.

CAPITAL IMPROVEMENTS

The schedule of capital improvements is presented in Tables 8-1 and 8-2. These tables describe in detail the proposed investment in construction and expansion of facilities as called for in the Brackett Field Master Plan. Table 8-1 presents the first phase (short-term) development costs and includes the projected timing. Table 8-2 includes the construction costs for Phases 2 and 3, and since these are longer range improvements the timing in terms of a specific year is not included. A summary of capital improvement costs is shown in Table 8-3.

Individual investment items comprising the development program were taken from the Airport Layout Plan. In addition, these items were based on discussions held with County and FAA representatives.

The estimated costs of capital improvements shown in Tables 8-1 and 8-2 are stated in 1991 dollars. These costs are based on unit costs developed by P&D and also analysis of data gathered from the airport sponsor, FAA, trade publications and experience at other airports.

The capital improvements plan is presented in the three phases used throughout the master planning analyses. It must also be remembered that the real determinate of the specific timing of demand related improvements (capacity oriented) is the actual traffic experienced. Therefore, the schedule presented does not commit the sponsor to provide such development until traffic levels reach those projected in this study. The costs projected for each phase are divided into a public and private sector portion. The public investment items outlined qualify for Federal AIP (Airport Improvement Program) and California Aid to Airports Program (CAAP) funding. All public investment construction is to be financed by the public sector.

FUNDING SOURCES

There are two grants-in-aid programs designed specifically for airport development: the FAA's Airport Improvement Program (AIP) and the State's California Aid to Airports Program (CAAP). Other funding sources are private capital, airport lease revenues, and County funds.

Table 8-1
PHASE 1 SCHEDULE OF IMPROVEMENTS

Project	Unit	Quantity	Unit Cost	Cost	Timing
PUBLIC INVESTMENT					
1. Widen R/W 8R-26L to 100'	SY	13,425	23.75	318,850	1992
2. Construct Angled-exit T/W for R/W 26	SY	760	19.50	14,800	1993
3. Construct Apron in Helo. Area	SY	6,400	25.25	161,600	1993
4. Widen South T/W & T/W F	SY	3,880	21.25	82,450	1994
5. Install MALSF	LS	1	75,000	75,000	1994
6. Construct Airport Maintenance Building	SF	1,100	40.25	44,300	1995
7. Install ASOS	LS	1	110,000	110,000	1995
Total Public Investment - Phase 1				**$807,000**	
PRIVATE INVESTMENT					
1. Relocate Remote Transmitter	LS	1	300,000	300,000	1992
2. Construct Fuel Tank (10,000 gallon)	LS	1	55,000	55,000	1992
3. Relocate Port-a-Ports	LS	1	10,000	10,000	1993
4. Construct Executive Hangars	SF	42,212	37.50	1,582,950	1993
5. Construct Auto Parking in Helo. Area	SY	2,900	11.75	34,100	1993
6. Construct Conv. Hangar in Helo. Area	SF	15,000	37.50	562,500	1993
7. Construct Apron for Helo. Area Hangar	SY	1,460	25.25	36,850	1993
8. Construct Conv. Hgr. in Bus. Acft. Area	SF	21,000	37.50	787,500	1994
Total Private Investment - Phase 1				**$3,368,900**	
TOTAL INVESTMENT - PHASE 1				**$4,175,900**	

Table 8-2

PHASES 2 & 3 SCHEDULE OF IMPROVEMENTS

Project	Unit	Quantity	Unit Cost	Cost
PHASE 2				
PUBLIC INVESTMENT				
1. Construct Holding Apron R/W 8R	SY	1,700	19.50	$33,150
2. Install MIRL R/W 8L-26R	LF	3,661	28.50	$104,350
3. Install PAPI R/W 26R	LS	1	15,000	$15,000
4. Construct Apron in Helo. Area	SY	6,400	25.25	$161,600
Total Public Investment - Phase 2				**$314,100**
PRIVATE INVESTMENT				
1. Construct Executive Hangars	SF	49,824	37.50	$1,868,400
2. Construct Conv. Hangar in Bus. Acft. Area	SF	21,000	37.50	$787,500
3. Construct Auto Parking in Helo. Area	SY	2,900	11.75	$34,100
Total Private Investment - Phase 2				**$2,690,000**
TOTAL INVESTMENT - PHASE 2				**$3,004,100**
PHASE 3				
PUBLIC INVESTMENT				
1. Install PAPI R/W 8L	LS	1	15,000	$15,000
Total Public Investment - Phase 3				**$15,000**
PRIVATE INVESTMENT				
1. Demolish 2 T-hangars	SF	40,000	0.50	$20,000
2. Construct Portable T-hangars	Spaces	52	11,250	$585,000
3. Construct T-hangars	Spaces	24	19,375	$465,000
4. Construct Conv. Hangar in Bus. Acft. Area	SF	21,000	37.50	$787,500
Total Private Investment - Phase 3				**$1,857,500**
TOTAL INVESTMENT - PHASE 3				**$1,872,500**

Table 8-3
SUMMARY OF CAPITAL IMPROVEMENT COSTS
(1991 Dollars)

Timing	Public Investment	Private Investment	Total Investment
Phase 1	$807,000	$3,368,900	$4,175,900
Phase 2	314,100	2,690,000	3,004,100
Phase 3	15,000	1,857,500	1,872,500
Total Plan	**$1,136,100**	**$7,916,400**	**$9,052,500**

FAA Airport Improvement Program (AIP)

On the federal level, the FAA's Aid to Airports Program provides funding for planning, construction, or rehabilitation at any public airport. The current grant program, known as the AIP, was established by the Airport and Airway Improvement Act of 1982 and amended by the Airport and Airway Safety and Capacity Expansion Act of 1987. The AIP provides funding through FY 1992 from the Airport and Airway Trust Fund for airport development, airport planning, noise compatibility planning and to carrying out noise compatibility programs.

The Trust Fund provides the revenues used to fund AIP projects. The Trust Fund concept guarantees a stable funding source whereby users pay for the services they receive. Taxes or user fees are collected from the various segments of the aviation community and placed in the Trust Fund. These taxes include an 8 percent tax on airline tickets, a 5 percent tax on freight waybills, a $3 international departure fee, and a $.12 and $.14 per gallon tax on general aviation gasoline and jet fuel, respectively.

The Airport and Airway Improvement Act of 1982, as amended, authorized the use of monies from the Airport and Airway Trust Fund to make grants under the Airport Improvement Program through fiscal year 1992, which ends on September 30, 1992. The following amounts are authorized for the AIP:

Year	Authorization Amount (Millions of Dollars)
1990	1700.0
1991	1800.0
1992	1800.0

Reauthorization will be necessary for funding after 1992.

Under the Act, the authorization for funds not obligated in a fiscal year carries forward to future fiscal years unless the Congress takes specific action to limit such amounts. During

the annual appropriations process, Congress may also limit the funding for grants to an amount that differs from the above authorization.

Projects eligible for AIP funding consist of: capital outlays for land acquisition; site preparation; construction, alteration, and repair of runways, taxiways, aircraft parking aprons, and roads within airport boundaries (except for access to areas providing revenue, such as parking lots and aviation industrial areas); construction and installation of lighting, utilities, navigational aids, and aviation-related weather reporting equipment and safety equipment required for certification of an airport facility; security equipment required of the sponsor by the Secretary of Transportation; limited terminal development at commercial service airports; and equipment to measure runway surface tension. Grants may ***not*** be made for the construction of hangars, automobile parking facilities, buildings not related to the safety of persons in the airport, landscaping or artwork, or routine maintenance and repair. Technical advisory services are also provided.

The Aid to Airports Program provides a maximum federal share of 90 percent for all eligible projects at Brackett Field. Because of the large number of projects competing for AIP funds, not all eligible projects can be funded.

In fiscal year 1990, $11,558,000 in AIP funds was available for "general aviation" airports in the State of California (excluding reliever airports). General aviation airports must be publicly-owned to receive AIP grants. There are presently 127 publicly-owned general aviation (non-reliever) airports in the State competing for the AIP funds. Although an average of $91,000 in AIP grant funds was available for each general aviation airport in 1990, proposed grant projects must compete with all other projects in the State on the basis of need.

The funds for AIP are distibuted in accordance with provisions contained in the 1982 Act. One of the provisions is that a minimum of 10 percent of all funds be used for reliever airports, of which Brackett Field is one. Thus, the Airport would qualify for AIP funds from this segment of the program.

California Aid to Airports Program (CAAP)

The CAAP provides two types of grant funding: annual grants, and acquisition and development grants.

The annual grants are used to fund preapproved, eligible projects and/or operations and maintenance of public-use airports with less than 85,000 annual passenger enplanements. The funds are a fixed amount of $5,000 annually and may be accrued for a maximum of five years with no matching requirements. Grants can be used for airport and aviation services such as marking systems, fencing, lighting, navigation aids, land acquisition, parking and tiedowns, noise monitoring, and obstruction/hazard removal. Funds can also be used for servicing of general obligation or revenue bonds issued to finance airport capital improvements and for operation and maintenance purposes.

Acquisition and development grants provide discretionary funds for airport projects included in the adopted State Transportation Improvement Program (STIP). The STIP is a five-year capital improvement program for which any publicly-owned, public-use airport may apply. Under the "true" five-year STIP, the funding period is the first year, and the remaining four years are "committed to" to the extent that funds are available. In prioritizing project submittals, the Department of Aeronautics uses the "STIP Project Evaluation Matrix" and an Airport Rating form.

Acquisition and development grants can be used to fund any capital improvements on an airport and for aviation purposes with runway maintenance projects receiving the highest priority for funding. Additionally, funds can be used for servicing general obligation or revenue bonds issued to finance airport capital improvements and for the local matching portions of Federal Airport Improvement Program grants. Funds ***cannot be used*** for operations or maintenance. Grant range from $10,000 to $500,000.

Total acquisition and development grant funding was $1,276,000 in fiscal year 1990. The current estimates of acquisition and development grants are as follows:

Fiscal Year	Grant Amount
1992	$3,720,000
1993	$3,820,000
1994	$4,002,000
1995	$3,420,000

There are 213 general aviation (including reliever) airports in California competing for these funds. Therefore the average funding per airport is approximately $17,500 in fiscal year 1991, and will decrease to $16,000 in fiscal year 1995. The State's fiscal year ends on June 30 (as opposed to September 30 for the federal government).

The California Transportation Commission annually establishes a local matching requirement which ranges from 10 to 50 percent of the non-Federal funded portion of the project cost. Since 1977/78, recipients have provided a minimum match of 10 percent of eligible project costs for acquisition and development projects.

In addition to grants-in-aid, the CAAP provides financial assistance in the form of low interest loans, repayable over a period not to exceed 25 years. Two types of loans are available: Revenue Generating Loans and Matching Funds loans. The interest rate for these loans is based on the most recent issue of State of California bonds sold prior to approval of the loan.

Funds from Revenue Generating Loans may be used for any projects not eligible for funding under other programs and which are designed to improve airport self-sufficiency. Loans of this type ***cannot*** be used for "land banks," automobile access roads and auto parking facilities

to accommodate airlines. The loan amounts are based upon an analysis of each individual application, after a public hearing is held, and subject to availability of funds. Matching fund loans may be used for securing Federal AIP grants, and the loan amount equals the 10 percent of project costs required to match a Federal grant. Requests for matching fund loans are given highest priority. Total loan funding in fiscal year 1990 was $1.4 million, and specific project funding ranged from $25,000 to $500,000. In the future, approximately $2 million per year is expected to be available for loan funds.

Private Capital

Private funding is often available for certain airport improvements, including aircraft hangar construction. It is assumed that future hangars at the Airport will be constructed with private funds on property leased from the Airport on a long-term basis. At the end of the lease period the hangars would be owned by the County.

Airport Revenues and County Funds

In the past the Airport has generated revenue through hangar and tie-down rentals, leases, and fuel sales and has operated profitably. It is presumed that the current contract with private airport management company will continue to provide the County with source of funds that can be used for airport development. However, net operating revenues are not expected to contribute significantly to funding capital improvements. Additionally, funds are available from the Department of Public Works Aviation Fund with loans also possible from the County General Fund.

The ALP indicates certain areas on the Airport reserved for aviation or aviation related use. Revenues are potentially available from the development of these areas, most notably the northwest and southeast corners of the Airport. Because the timing of possible development is uncertain, the availability of revenues should not included as a funding source.

Project Cost Shares

Total public investment is estimated to equal $1.1 million, in 1991 dollars, for all three phases of the planning period. When including private investment items, projects not eligible for federal or state funding assistance, the total development program costs will equal $9.1 million in 1991 dollars.

Table 8-4 presents the capital budget, in which an analysis of the public investment construction costs in the first phase planning period. The table totals each year's expenditures in current (1991) dollars, and then calculates the approximate AIP, CAAP, and local funding requirements, also in current dollars. Federal assistance will be in the form of Discretionary funds of the AIP and based on current legislation, AIP will cover 90 percent of eligible costs of the public investment. It is a reasonable expectation that Federal participation will be in full (i.e., 90 percent), for eligible projects.

Table 8-4
CAPITAL BUDGET - ANNUAL PUBLIC INVESTMENT

Project	Cost	Timing	Estimated FAA Funds	Estimated State Funds	Estimated County Funds
PHASE 1					
1. Widen R/W 8R-26L to 100'	$318,850	1992	$286,965	$25,000	$6,885
2. Construct Angled-exit T/W for R/W 26R	$14,800	1993	$13,320	$0	$1,480
3. Construct Apron in Helo. Area	$161,600	1993	$145,440	$0	$16,160
4. Widen South T/W & T/W F	$82,450	1994	$74,205	$0	$8,245
5. Install MALSF	$75,000	1994	$75,000	$0	$0
6. Construct Airport Maintenance Building	$44,300	1995	$0	$0	$44,300
7. Install ASOS	$110,000	1995	$110,000	$0	$0
Total Public Investment - Phase 1	**$807,000**		**$704,930**	**$25,000**	**$77,070**
PHASE 2					
1. Construct Holding Apron R/W 8R	$33,150	1996	$29,835	$0	$3,315
2. Install MIRL R/W 8L-26R	$104,350	1997	$93,915	$0	$10,435
3. Install PAPI R/W 26R	$15,000	1997	$13,500	$0	$1,500
4. Construct Apron in Helo. Area	$161,600	1998	$145,440	$0	$16,160
Total Public Investment - Phase 2	**$314,100**		**$282,690**	**$0**	**$31,410**
PHASE 3					
1. Install PAPI R/W 8L	$15,000	2001	$13,500	$0	$1,500
Total Public Investment - Phase 3	**$15,000**		**$13,500**	**$0**	**$1,500**
TOTAL PUBLIC INVESTMENT	**$1,136,100**		**$1,001,120**	**$25,000**	**$109,980**

Note: Estimated State funds reflect an assumed five year accrual of annual grants.

Source: P&D analysis

State funds are not expected to be a major source of financing. It has been assumed for Phase 1 that participation in the runway widening project reflects a five year accrual of annual grants.

Total Federal, state, and local government funding for capital improvements over all three phases of the Master Plan is estimated, in current dollars, to be:

- Federal AIP Funding - $1 million
- State Funding - $25,000
- County Funding - $110,000

Private investment in capital improvements over the course of the planning period were previously itemized in Tables 8-1 and 8-2. Total private investment in the Airport is estimated to total $7.9 million, in current dollars 1991 dollars, and represents projects ineligible for FAA funding. For the most part these costs include development of hangars recommended in the plan, but also would include auto parking and apron in the immediate vicinity of a private hangar and fuel facilities. It has also been assumed that relocation of the remote transmitter is not reimbursable from FAA. The private investment can be provided by private sources, or the County could elect to fund projects, such as hangars, out of the County's airport fund.

Appendix A
Glossary and Abbreviations

GLOSSARY AND ABBREVIATIONS

"A"

A-WEIGHTED SOUND LEVEL - The sound pressure level which has been filtered or weighted to reduce the influence of low and high frequency (dBA).

AC - Advisory Circular published by the Federal Aviation Administration.

ACCOM. - Accommodations

ADPM - Average Day of the Peak Month

AFB - Air Force Base

AIA - Annual Instrument Approaches

AICUZ - Air Installation Compatible Use Zones define areas of compatible land use around military airfields.

AIR CARRIER - A commercial scheduled service airline carrying interregional traffic.

AIRCRAFT MIX - The relative percentage of operations conducted at an airport by each of four classes of aircraft differentiated by gross takeoff weight and number of engines.

AIRCRAFT TYPES - An arbitrary classification system which identifies and groups aircraft having similar operational characteristics for the purpose of computing runway capacity.

AIR NAVIGATIONAL FACILITY (NAVAID) - Any facility used for guiding or controlling flight in the air or during the landing or takeoff of aircraft.

AIR ROUTE SURVEILLANCE RADAR (ARSR) - Long-range radar which increases the capability of air traffic control for handling heavy enroute traffic. An ARSR site is usually located at some distance from the ARTCC it serves. Its range is approximately 200 nautical miles. Also called ATC Center Radar.

AIR TAXI - Aircraft operated by a company or individual that performs air transportation on a non-scheduled basis over unspecified routes usually with light aircraft.

AIRPORT AVAILABLE FOR PUBLIC USE - An airport available for use by the public with or without a prior request.

AIRPORT ENVIRONS - The area surrounding an airport that is affected by airport operations.

AIRPORT LAYOUT PLAN (ALP) - The current and planned airport development portrayal, which may be part of an airport master plan.

AIRPORT MASTER PLAN (AMP) - A long term development plan for an airport, adopted by the airport proprietor.

AIRPORT NOISE COMPATIBILITY PROGRAM - A program developed in accordance with FAR Part 150, including measures proposed or taken by the airport operator to reduce existing incompatible land use and to prevent the introduction of additional incompatible land uses within the area.

AIRPORT SURVEILLANCE RADAR (ASR) - Radar providing position of aircraft by azimuth and range of data without elevation data. It is designed for a range of 50 miles. Also called ATC Terminal Radar.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC) - A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

AIRSPACE - The space lying above the earth or above a certain area of land or water which is necessary to conduct aeronautical operations.

ALERT AREA - Airspace which may contain a high volume of pilot training activities or unusual type of aerial activity.

ALP - Airport Layout Plan

ALSF-1 - Approach Light System with Sequence Flasher Lights.

AGL - Above Ground Level

ALS - Approach Light System

AMBIENT NOISE - All encompassing noise associated with a given environment, being usually a composite of sounds from many sources near and far.

ANCLUC - Airport Noise and Compatible Land Use Control plan; an FAA sponsored land use compatibility planning program preceding Part 150 Airport Noise Compatibility Program.

APPROACH CONTROL SERVICE - Air traffic control service provided by a terminal area traffic control facility for arriving and departing IFR aircraft and, on occasion, VFR aircraft.

APPROACH FIX - The point from or over which final approach (IFR) to an airport is executed.

APPROACH SLOPE - Imaginary areas extending out and away from the approach ends of runways which are to be kept clear of obstructions.

APPROACH SURFACE - An element of the airport imaginary surfaces, longitudinally centered on the extended runway centerline, extending upward and outward from the end of the primary surface at a designated slope.

AREA NAVIGATION(RNAV) - A method of navigation that permits aircraft operations on any desired course within the coverage or stationed-reference navigation systems or within the limits of self-contained system capability.

ARTS-III - Automated Radar Terminal Service - Phase III. A terminal facility in the air traffic control system using air ground communications and radar intelligence to detect and display pertinent data such as flight identification, altitude and position of aircraft operating in the terminal area.

ASDE - Airport Surface Detection Equipment

ASV - Annual Service Volume - a reasonable estimate of the airfield's annual capacity.

ATCT - Airport Traffic Control Tower

ATC - Air Traffic Control

AVIGATION AND HAZARD EASEMENT - An easement which provides right of flight at any altitude above the approach surface, prevents any obstruction above the approach surface, provides a right to cause noise vibrations, prohibits the creation of electrical interferences, and grants right-of-way entry to remove trees or structures above the approach surface.

"B"

BASED AIRCRAFT - An aircraft permanently stationed at the airport, usually by some form of agreement between the aircraft owner and airport management.

BIT - Bituminous Asphalt Pavement

BUSINESS JET - Any of a type of turbine powered aircraft carrying six or more passengers and weighing less than 65,000 pounds gross takeoff weight.

"C"

CY - Calendar Year

CARGO - Originating and/or terminating.

CAT I - Category I Instrument Landing System. (Minimums: decision height of 200 feet; Runway visual range 1,800 feet).

CAT II - Category II Instrument Landing System. (Minimums: decision height of 100 feet; Runway visual range 1,200 feet).

CAT III - Category III Instrument Landing System. (Minimums: no decision height; Runway visual range of from 0 to 700 feet depending on type of CAT III facility).

CALIBRATION - The procedure used to adjust an urban area traffic model so that it matches base year of present day conditions.

CAPACITY - The maximum number of vehicles which have a reasonable expectation of passing over a given section of a lane or a roadway during a given period under a specified speed or level of service.

CAPACITY MANUAL - Special Report 87 published by the Highway Research Board (now Transportation Research Board). Current issue is 1985.

CAPACITY RESTRAINT - See Trip Assignment.

CENTER'S AREA - The specified airspace within which an air route traffic control center provides air traffic control and advisory service.

CFR - Crash, Fire and Rescue (now called Airport Rescue and Fire Fighting (ARFF)

CIRCLING APPROACH - A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in instrument approach is not possible. This maneuver requires ATC clearance and that the pilot establish visual reference to the airport.

CL - Centerline

CLEAR ZONE - Inner portion of runway approach zone.

CNEL - Community Noise Equivalent Level - a noise metric used in California to describe the overall noise environment of a given area from a variety of sources.

COLLECTOR - A roadway with no control of access providing movement between residential areas and the arterial system.

COMM. - Communications

COMMERCIAL SERVICE AIRPORT - A public airport which received scheduled passenger service and enplanes annually 2,500 or more passengers.

COMMUTER AIRLINE - Aircraft operated by an airline that performs scheduled air transportation service over specified routes using light aircraft.

CONC. - Portland Cement Concrete Pavement

CONICAL SURFACE - An imaginary surface extending upward and outward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

CONNECTION - A passenger who boards an aircraft directly after deplaning from another flight. On-line single carrier connections involve flights of the same carrier, while interline or off-line connections involve flights of two different carriers. This term can also be applied to freight shipments.

CONTINENTAL CONTROL AREA - This includes the airspace at and above 14,500 feet MSL of the 48 contiguous states, the District of Columbia, and Alaska, excluding the Alaskan peninsula west of longitude 160 degreees west. It does not include the airspace less than 1,500 feet above the surface of the earth nor most prohibited or restricted areas.

CONTROL AREAS - These consist of the airspace designated as VOR Federal Airways, additional Control Area Extensions but do not include the Continental Control Area. Control zones that do not underlie the continental control area have no upper limit. A control zone may include one or more airports and is normally a circular area with a radius of 5 statute miles and any extensions necessary to include instrument departure and arrival paths.

CONTROLLED AREA - Airspace within which some or all aircraft may be subject to air traffic control.

CONTROL TOWER - A central operations facility in the terminal air traffic control system consisting of a tower cab structure (including an associated IFR room if radar equipped) using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

CONTROL ZONES - These are areas of controlled airspace which extend upward from the surface and terminate at the base of the continental control area. Control zones that do not underlie the continental control area have no upper limit. A control zone may include one or more airports and is normally a circular area with a radius of 5 statute miles of any extensions necessary to include instrument departure and arrival paths.

CONTROLLED AIRSPACE - Airspace designated as continental control area, control area, control zone or transition area within which some or all aircraft may be subject to air traffic control.

CORRIDOR - A swath of area surrounding a proposed facility that encompasses all the

possible locations for that facility that would still serve the originally intended purpose for that facility.

CRITICAL LANE VOLUME ANALYSIS - A short-cut technique for relating the level of service at intersections to traffic volumes in the "critical lane."

CROSSWIND RUNWAY - A runway aligned at an angle to the prevailing wind which allows use of an airport when crosswind conditions on the primary runway would otherwise restrict use.

CURFEW - A restriction placed upon all or certain classes of aircraft by time of day, for purposes of reducing or controlling airport noise.

CYCLE - The time period required for one complete sequence of signal indications .

"D"

DECISION HEIGHT (DH) - With respect to the operation of aircraft, this means the height at which a decision must be made, using an ILS or PAR instrument approach, to either continue the approach or to execute a missed approach.

DEMAND - The actual number of persons, aircraft or vehicles currently using a facility if that facility is operating at or below capacity or the number of persons, aircraft or vehicles who want to use the facility when the facility is operating above capacity.

DEPLANEMENT - Any passenger getting off an arriving aircraft at an airport. Can be both a terminating and connecting passenger. Also applies to freight shipments.

DESIGN HOUR VOLUME (DHV) - The number of vehicles expected to use a road section, intersection, etc. in the design hour, which is usually the 30th highest hour of the year for commuter roads, the 150th highest hour for recreational roads, twice the average for shopping center facilities, etc.

DESIGN SPEED - The maximum safe speed for which the various physical features of the roadway were designed.

DISTANCE MEASURING EQUIPMENT (DME) - An electronic installation established with either a VOR or ILS to provide distance information from the facility to pilots by reception of electronic signals. It measures, in nautical miles, the distance of an aircraft from a NAVAID.

DIRECTIONAL SPLIT - The proportional distribution between access and egress flows of traffic into and out of a development or between opposite flows of traffic on two-way streets or highways.

DPW - Department of Public Works

"E"

ENPLANEMENT - Any passenger boarding a departing aircraft at an airport. Can be both a local origin and a connecting passenger. Applies also to freight shipments.

ENROUTE - The route of flight from point of departure to point of destination, including intermediate stops (excludes local operations).

ENROUTE AIRSPACE - Controlled airspace above and/or adjacent to terminal airspace.

EQUIVALENT SOUND LEVEL (LEQ) - The steady A-weighted sound level over a specified period that has the same acoustic energy as the fluctuating noise during that period.

EXPRESSWAY - A divided highway for through traffic with full or partial control of access generally using grade separated interchanges and some well spaced at-grade intersections.

"F"

F&E - Facilities and Equipment Programming - FAA

FAA - Federal Aviation Administration of the United States Department of Transportation

FAR - Federal Aviation Regulation

FAR Part 36 - A regulation establishing noise certification standards for aircraft.

FAR Part 77 - A regulation establishing standards for determining obstructions to navigable airspace.

FAR Part 150 - A regulation establishing criteria for noise assessment and procedures and criteria for FAA approval of noise compatibility programs.

FBO - Fixed Base Operator

FEDERAL AIRWAYS - See Low Altitude Airways.

FINAL APPROACH IFR - The flight plan of landing aircraft in the direction of landing along the extended runway centerline from the base leg to the runway.

FLEET MIX - The proportion of aircraft types or models expected to operate at an airport.

FLIGHT SERVICE STATION (FSS) - A facility operated by the FAA to provide flight assistance service.

FREEWAY - A divided highway for through traffic with full control of access at grade separated interchanges.

FY - Fiscal Year

"G"

GA - General Aviation - Refers to all civil aircraft and operations which are not classified as air carrier.

GENERATION - See trip generation.

GLIDE SCOPE (GS) - The vertical guidance component of an Instrument Landing System (ILS).

GND CON. - Ground Control

GRAVITY MODEL - Newton's Law of Gravitation used to simulate traffic movements by distributing trips among zonal pairs in direct proportion to the number of trips originating in those zones and in inverse proportion to a measure of the spatial separation between the zones, such as travel time.

"H"

HGRS. - Hangars

HIGH ALTITUDE AIRWAYS - See Jet Routes.

HIRL - High Intensity Runway Lighting

HOLDING - A predetermined maneuver which keeps an aircraft within a specified airspace while awaiting further clearance.

HORIZONTAL SURFACE - An imaginary surface constituting a horizontal plane 150 feet above the airport elevation.

"I"

IFR - Instrument Flight Rules that govern flight procedures under IFR conditions (limited visibility or other operational constraints).

IMAGINARY SURFACE - An area established in relation to the airport and to each runway consistent with FAR Part 77 in which any object extending above these imaginary surfaces is, by definition, an obstruction.

INDUCED TRIPS - See Trip.

INSTRUMENT APPROACH - A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the intial approach to a landing or to a point from which a landing may be made visually.

INSTRUMENT LANDING SYSTEM (ILS) - A precision landing aid consisting of localizer (azimuth guidance), glide slope (vertical guidance), outer marker (final approach fix) and approach light system.

INSTRUMENT OPERATION - A landing or takeoff conducted while operating on an instrument flight plan.

INSTRUMENT RUNWAY - A runway equipped with electronic and visual navigation aids for which a precision or non-precision approach procedure having straight-in landing minimums has been established.

INTEGRATED NOISE MODEL (INM) - A computer-based airport noise exposure modelling program.

ISOPLETH - A line on a map connecting points at which a given variable (ground travel time) has a specified constant value.

ITINERANT OPERATIONS - All aircraft arrivals and departures other than local operations.

INTERNATIONAL OPERATIONS - Aircraft operations performed by air carriers engaged in scheduled international service.

"J"

JET ROUTES - A route designed to serve aircraft operating from 18,000 feet MSL up to and including flight level 450.

"L"

LAT - Latitude

LDA - Localizer Type Directional Aid

LDN - Day-Night Average Sound Level. The 24-hour average sound level, in decibels, from

midnight to midnight, obtained after the addition of ten decibels to sound levels for periods between 10 p.m. and 7 a.m.

LDNG. AIDS - Landing Aids

LENGTH OF HAUL - The non-stop airline route distance from a particular airport.

LEVEL OF SERVICE - An arbitrary but standardized index of the relative service provided by a transportation facility.

LIRL - Low Intensity Runway Lighting

LOAD FACTOR - Ratio of the number of passenger miles to the available seat miles flown by an airline representing the proportion of aircraft seating capacity that is actually sold and utilized. Load factors are also referred to in air cargo and can be determined by weight or volume.

LOC - Localizer (part of a ILS)

LOCAL OPERATION - Operations performed by aircraft which: (a) operate in the local traffic pattern or within the sight of the tower; (b) are known to be departing for, or arriving from, flight in local practice areas located within a 20-mile radius of the control tower, or (c) execute simulated instrument approaches or low passes at the airport.

LOM - Compass locator at an outer marker (part of an ILS). Also call COMLO.

LONG - Longitude

LOW ALTITUDE AIRWAYS - Air routes below 18,000 feet MSL. They are referred to as Federal Airways.

LRR - Long-Range Radar

"M"

MALS - Medium Intensity Approach Light System

MALSF - Medium Intensity Approach Light System with sequence flashing lights.

MALSR - MALS with Runway Alignment Indicator Lights (RAIL)

MARKER BEACON - An electronic navigation facility which transmits a fan or boneshaped radiation pattern. When received by compatible airborne equipment they indicate to the pilot that he is passing over the facility. Two to three beacons are used to advise pilots of their position during an ILS approach.

MASTER PLAN - Long-range plan of airport development requirements.

MGW - Maximum Gross Weight

MILITARY OPERATION - An operation by military aircraft.

MINIMUM DESCENT ALTITUDE (MDA) - The lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or during circling-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glide slope is provided.

MIRL - Medium Intensity Runway Lighting

MISSED APPROACH - A prescribed procedure to be followed by aircraft that cannot complete an attempted landing at an airport.

MITL - Medium Intensity Taxiway Lighting

MLS - Microwave Landing System

MM - Middle Marker (part of an ILS)

MOA - Military Operations Area

MODAL SPLIT - The distribution of trips among competing travel modes, such as walk, auto, bus, etc.

MODE - A particular form or method of travel such as walk, auto, carpool, bus, rapid transit, etc.

MOVEMENT - Synonymous with the term operation, i.e., a takeoff or a landing.

MSL - Mean Sea Level

"N"

NA - Not applicable

NAS - NATIONAL AIRSPACE SYSTEM - The common system or air navigation and air traffic encompassing communications facilities, air navigation facilities, airways, controlled airspace, special use airspace and flight procedures authorized by Federal Aviation Regulations for domestic and international aviation.

NAVAID - See Air Navigation Facility.

NB - Northbound

NDB - NON-DIRECTIONAL BEACON - An electronic ground station transmitting in all directions in the L/MF frequency spectrum; provides azimuth guidance to aircraft equipped with direction finder receivers. These facilities are often established with ILS outer markers to provide transition guidance to the ILS system.

NEPA - National Environmental Policy Act

NM - Nautical Mile

NOISE ABATEMENT - A procedure for the operation of aircraft at an airport which minimizes the impact of noise on the environs of the airport.

NOISE CONTOUR - A noise impact boundary line connecting points on a map where the level of sound is the same.

NOISE EXPOSURE MAP - A scaled, geographic depiction of an airport, its noise contours and surrounding area.

NOISE LEVEL REDUCTION (NLR) - The amount of noise level reduction achieved through incorporation of noise attenuation (between outdoor and indoor levels) in the design and construction of a structure.

NON-PRECISION APPROACH - A standard instrument approach procedure in which no electronic glide slope is provided.

NPI - Non-Precision Instrument Runway

"O"

OAG - Official Airline Guide

OBSTRUCTION - Any structure, growth, or other object, including a mobile object, that exceeds a limiting height established by federal regulations or by a hazard zoning regulation.

OM - Outer Marker (part of an ILS)

OPERATING SPEED - The maximum average speed for a given set of roadway and traffic conditions.

OPERATION - An aircraft arrival at or departure from an airport.

ORIGINATION - A passenger boarding an aircraft at an airport who has started his trip from a local, off-airport point. Also applicable to freight shipments.

OUTER FIX - A point in the destination terminal area from which aircraft are cleared to the approach fix or final approach course.

"P"

PAPI - Precision Approach Path Indicator

PAR - Precision Approach Radar

PAX - Passenger

PEAK HOUR FACTOR - The ratio of the average flow rate during the peak hour to the highest short-term (say 15 minutes) rate within the peak hour.

PEAK HOUR PERCENTAGE - The percentage of total daily trips or traffic occurring in the highest or "peak" hour. Frequently confused with Peak Hour Factor.

PERSON TRIP - A trip made by a person by any travel mode or combination of travel modes. A carpool of four persons entails one vehicle trip and four person trips.

PHASE - A part of the cycle allocated to any traffic movement or any combination of traffic movements.

PI - Precision Instrument Runway marking.

POSITIVE CONTROL AREA - Airspace wherein aircraft are required to be operated under Instrument Flight Rules.

PRECISION APPROACH - A standard instrument approach procedure in which an electronic glideslope/glidepath is provided; eg., ILS/MLS and PAR.

PRIMARY COMMERCIAL SERVICE AIRPORT - A commercial service airport which enplanes .01 percent or more of the total annual U.S. enplanements.

PRIMARY RUNWAY - The runway on which the majority of operations take place. On large, busy airports, there may be two or more parallel primary runways.

PRIMARY SURFACE - An area longitudinally centered on a runway with a width ranging from 250 to 1000 feet and extending 200 feet beyond the end of a paved runway.

PRODUCTION - A trip end associated with a dwelling unit or other trip "producer."

PROHIBITED AREA - Airspace of defined dimensions identified by an area on the surface of the earth within flight is prohibited.

PU - Publicly owned airport.

PVC - Poor visibility and ceiling.

PVT - Privately owned airport.

"Q"

QUEUE - A line of pedestrians or vehicles waiting to be served.

"R"

RADAR SEPARATION - Radar spacing of aircraft in accordance with established minima.

RAIL - Runway Alignment Indicator Lights

RCAG - Remote Center Air/Ground Communications

REIL - Runway End Identification Lights

RELIEVER AIRPORT - An airport which, when certain criteria are met, relieves the aeronautical demand on a high density air carrier airport.

RESTRICTED AREAS - Airspace of defined dimensions identified by an area on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restrictions.

RNAV - See Area Navigation.

ROTATING BEACON - A visual NAVAID displaying flashes of white and/or colored light used to indicate location of an airport.

RVR - Runway Visual Range

RVV - Runway Visibility Value

R/W - Runway

R/W SAFETY AREA - An area symmetrical about the runway centerline and extending beyond the ends of the runway which shall be free of obstacles as specified.

"S"

SALS - Short Approach Light System

SCREEN LINE - A line dividing a study area into two parts and used for a detailed comparison of measured and simulated traffic or travel during a model calibration process.

SDF - Simplified Directional Facility landing aid providing final approach course.

SEGMENTED CIRCLE - An airport aid identifying the traffic pattern direction.

SEPARATION MINIMA - The minimum longitudinal, lateral, or vertical distances by which aircraft are spaced through the application of air traffic control procedures.

SMSA - Standard Metropolitan Statistical Area.

SOCIOECONOMIC - Data pertaining to the population and economic characteristics of a region.

SSALF - Simplified Short Approach Light System with Sequence Flashing lights.

SSALS - Simplified Short Approach Light System.

SSALR - Simplified Short Approach Light System with Runway Alignment Indicator Lights (RAIL)

STANDARD LAND USE CODING MANUAL (SLUCM) - A standard system for identifying and coding land use activities published by the U.S. Department of Housing and Urban Development and the Federal Highway Administration.

STRAIGHT-IN APPROACH - A descent in an approved procedure in which the final approach course alignment and descent gradient permits authorization of straight-in landing minimums.

STOL - Short Takeoff and Landing

STOVL - Short Takeoff Vertical Landing

SYSTEM PLAN - A representative of the aviation facilities required to meet the immediate and future air transportation needs and to achieve the overall goals.

"T"

TACAN - Tactical Air Navigation

TDZ - Touchdown Zone

TERMINAL AIRSPACE - The controlled airspace normally associated with aircraft departure and arrival patterns to/from airports within a terminal system and between adjacent terminal systems in which tower enroute air traffic control service is provided.

TERMINAL CONTROL AREA (TCA) - This consists of controlled airspace extending upward from the surface or higher to specified altitudes within which all aircraft are subject to positive air traffic control procedures.

TERPS - Terminal Instrument Procedures

T-HANGAR - A T-shaped aircraft hangar which provides shelter for a single airplane.

THRESHOLD - The beginning of that portion of the runway usable for landing.

TOUCH-AND-GO OPERATION - An operation in which the aircraft lands and begins takeoff roll without stopping.

TRAFFIC ANALYSIS OR ZONE - A subdivision of a study area used to aggregate dispersed data items, such as population, employment, etc., in preparation for estimating the trips attracted or produced by these data items and for loading such attractions and productions onto a simulation network.

TRAFFIC CONTROL DEVICE - Any sign, signal, marking or device placed or erected for the purpose of regulating, wording or guiding vehicular traffic and/or pedestrians.

TRAFFIC PATTERN - The traffic flow that is prescribed for aircraft landing at, taxiing on, and taking off from an airport. The usual components of a traffic pattern are upwind leg, crosswind leg, downwind leg and final approach.

TRANSIENT OPERATIONS - See Itinerant Operations.

TRANSITION SURFACE - An element of the imaginary surfaces extending outward at right angles to the runway centerline and from the sides of the primary and approach surfaces to where they intersect the horizontal and conical surfaces.

TRANSITIONAL AIRSPACE (TRANSITION AREA) - Areas designated to contain IFR operations in controlled airspace during portions of the terminal operations and while transitioning between the terminal and enroute environment.

TRAVEL SHED - The total contributing area that generates trips which ultimately concentrate at a selected study point. Also called a travel sector.

TRIP - The one-way unit of travel between an origin and a destination.

TRIP ASSIGNMENT - That portion of the transportation planning process where distributed trips are allocated among the actual routes they can be expected to use.

TRIP DISTRIBUTION - That portion of the transportation planning process that estimates the spatial distribution of trips estimated during the trip generation phase.

TRIP END - The beginning or end of a trip.

TRIP GENERATION - That portion of the transportation planning process concerned with developing an estimate of the total number of trips attracted or produced by each traffic analysis zone in a study area.

TRIP PURPOSE - The primary reason for making a trip, i.e., work, shop.

TW & T/W - Taxiway

TWR - Control Tower

TVOR - Terminal Very High Frequency Omnirange Station

"U"

UHF - Ultra High Frequency

UNCONTROLLED AIRSPACE - That portion of the airspace that has not been designated as continental control area, control area, control zone, terminal control area or transition area and within which ATC has neither the authority nor the responsibility for exercising control over air traffic.

UNICOM - Radio communications station which provides pilots with pertinent airport information (winds, weather, etc.) at specific airports.

UTILITY RUNWAY - A runway intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight or less.

"V"

VASI - Visual Approach Slope Indicator providing visual glide path.

VASI-2 - Two Box Visual Approach Slope Indicator

VASI-4 - Four Box Visual Approach Slope Indicator

VECTOR - A heading issued to an aircraft to provide navigational guidance by radar.

VEHICLE MILES OF TRAVEL (VMT) - A measure of total travel within a study area, usually estimated as the total number of trips multiplied by the average length of a typical trip.

VFR - Visual Flight Rules that govern flight procedures in good weather.

VFR AIRCRAFT - An aircraft conducting flight in accordance with Visual Flight Rules.

VHF - Very High Frequency

VISUAL APPROACH RUNWAY - A runway intended for visual approaches only.

VOR - Very High Frequency Omnirange Station. A ground-based radio (electronic) navigation aid transmitting radials in all directions in the VHF frequency spectrum; provides azimuth guidance to pilots by reception of electronic signals.

VORTAC - Co-located VOR and TACAN.

V/STOL - Vertical/Short Takeoff and Landing

VTOL - Vertical Takeoff and Landing (includes, but is not limited to, helicopters).

"W"

WARNING AREA - Airspace which may contain hazards to non-participating aircraft in international airspace.

WB - Westbound

WIND CONE (WIND SOCK) - Conical wind directional indicator.

WIND TEE - A visual device used to advise pilots about wind direction at an airport.

"Y"

YEARLY DAY-NIGHT AVERAGE SOUND LEVEL (Ldn) - The 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. the following day, averaged over a span of one year.

Appendix B
FBO Survey

FBO SURVEY

FBO	Contact
Aerofix	Lee Conners
Air-Vision	Kirk McNabb
Brackett Aircraft Radio	Alberto Gacharna, Sr.
Parker Aero Development	Ken Handman
Pomona Aero Center	Don Blue
Pomona Police Department	Bill Roush
Ranger Hangars	Marv Alexander (KMR Aviation)
Runway 3-7	Lloyd Smith
Sun Pacific Airlines	Miguel Avila
West Air Instruments	Doug Yoast

Appendix C
Aircraft Owners Survey Questionnaire

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (818) 458-5100

THOMAS A. TIDEMANSON, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

BRACKETT FIELD MASTER PLAN
GENERAL AVIATION SURVEY

The County of Los Angeles is developing an airport master plan for Brackett Field. An important plan objective is to incorporate improvements which are felt to be needed by existing and future airport users. To this end, we would very much appreciate your comments regarding future airport improvements. Please help us by taking a moment of your time to respond to the following questions.

OPTIONAL QUESTION

1. Please provide your name and phone number, if we may call you to discuss your responses.

   Name _____

   Day Phone _____

ALL RESPONDENTS PLEASE ANSWER THE FOLLOWING QUESTIONS

2. Where do you live?

   State _____ City _____ Zip Code _____

3. If you now use Brackett Field, please check your type of use(s).

   _____ Have aircraft based there.

   _____ Own a fixed base operation or other business on airport.

   _____ Member of flying club or rent/lease aircraft.

   _____ Transient flights to and from the airport.

   _____ Other: _____

4. If you now use Brackett Field, please list in importance to you, the main improvements you would like to see made.

   _____

   _____

   _____

   _____

BRACKETT FIELD
1615 McKinley Avenue
La Verne, California 91750
(818) 966-9548
(714) 593-1395

COMPTON AIRPORT
901 W. Alondra Boulevard
Compton, California 90220
(213) 631-8140

EL MONTE AIRPORT
4233 N. Santa Anita Ave.
El Monte, California 91731
(818) 448-6129

GENERAL WM. J. FOX FIELD
4555 West Avenue G
Lancaster, California 93534
(805) 945-8299

WHITEMAN AIRPORT
12653 Osborne Street
Pacoima, California 91331
(818) 896-5271

5. If you do not now use Brackett Field but use another airport, please indicate the airport used and describe your type of use.

Airport primarily used: _____

Type of use:

_____ Have aircraft based there.

_____ Operate fixed base operation or other business on airport.

_____ Rent or lease aircraft.

_____ Transient flights to and from the airport.

_____ Other: _____

6. If you do not now use Brackett Field but use another airport, please describe the changes/improvements by order of importance which would cause you to shift your use to this airport.

_____

_____

_____

_____

_____

_____

7. Please give us any comments you have pertaining to the Airport and/or the Master Planning Study.

_____

_____

_____

_____

_____

_____

8. Rate the adequacy of existing services and facilities as you have observed them at Brackett Field.

	Excellent		Satisfactory		Poor
Security	____	____	____	____	____
FBO Services	____	____	____	____	____
Flight Instruction	____	____	____	____	____
Charter Service	____	____	____	____	____
Aircraft Maintenance	____	____	____	____	____
Navigational Aids	____	____	____	____	____
Transient Parking	____	____	____	____	____
Tiedowns	____	____	____	____	____
Auto Parking	____	____	____	____	____
Hangar Facilities	____	____	____	____	____
Fueling	____	____	____	____	____
Restrooms	____	____	____	____	____
Central Bulletin Board	____	____	____	____	____
Pavement Condition	____	____	____	____	____
Crosswind Coverage	____	____	____	____	____
Other: _____	____	____	____	____	____

	Very Low		Average		Very High
Flight School Rates	____	____	____	____	____
Maintenance Rates	____	____	____	____	____
Fuel Costs	____	____	____	____	____
Hangar Rental Rate	____	____	____	____	____
Tiedown Rates	____	____	____	____	____
Transient Parking Rates	____	____	____	____	____

9. Indicate by priority the physical improvements you would like to see at Brackett Field.

	Highest Priority				Lowest Priority
Additional T-hangars	_____	_____	_____	_____	_____
Additional Tiedowns	_____	_____	_____	_____	_____
Additional Transient Parking	_____	_____	_____	_____	_____
Runway Extension	_____	_____	_____	_____	_____
Crosswind Runway	_____	_____	_____	_____	_____
Pavement Resurfacing	_____	_____	_____	_____	_____
Reconfiguration of Taxiways	_____	_____	_____	_____	_____
Wash Rack	_____	_____	_____	_____	_____
Expanded Security Program	_____	_____	_____	_____	_____
Improved Auto Access/ Parking	_____	_____	_____	_____	_____
Navaids: _____	_____	_____	_____	_____	_____
Hotel/Motel:	_____	_____	_____	_____	_____
Restaurant:	_____	_____	_____	_____	_____
Other: _____	_____	_____	_____	_____	_____

PLEASE ANSWER THE REMAINING QUESTIONS THAT APPLY TO YOU

10. If you have aircraft based at Brackett Field, please provide the following information.

Aircraft Type	Number Aircraft	Annual Takeoffs at Brackett Airport *	Percent Touch and Go
Single-engine under 4 place	_____	_____	_____
Single-engine 4 place and over	_____	_____	_____
Multi-engine - piston	_____	_____	_____
Turboprop	_____	_____	_____
Turbojet	_____	_____	_____
Helicopter	_____	_____	_____
Other: _____	_____	_____	_____

*Include Touch and Go Operations

11. If you have aircraft based at Brackett Field, indicate the factors that most influenced you to locate your aircraft there.

_____ Proximity to home.

_____ Proximity to business.

_____ Favorable flying conditions.

_____ Availability of facilities.

_____ Availability of services.

_____ Cost of services.

_____ Other: _____

12. If you have aircraft based at Brackett Field, please indicate the number of your aircraft in tiedowns and hangars.

	Present Method of Storing Based Aircraft	Preference if Additional Hangars Were Available
Number in Tiedowns	_____	_____
Number in Hangars	_____	_____

13. If you fly to/from Brackett Field, what percentage of your flights are for the following purposes?

	Business	Personal	Training	Other
Single-engine under 4 place	_____	_____	_____	_____
Single-engine 4 place and over	_____	_____	_____	_____
Multi-engine piston	_____	_____	_____	_____
Turboprop	_____	_____	_____	_____
Turbojet	_____	_____	_____	_____
Helicopter	_____	_____	_____	_____

14. If you fly to/from Brackett Field, please estimate the amount of money spent annually in the area for the operation of your aircraft.

Hangar/Tiedown $_____

Fuel $_____

Maintenance $_____

Insurance $_____

Other: _____ $_____

Total $_____

15. If you are a transient flyer to Brackett Field, please provide the following information.

_____ Number of flights per year to Brackett Field

_____ Approximate air distance (nautical miles) to your home base

Services used at Brackett Field:

Fuel _____ Maintenance _____ Overnight Tiedowns _____

Services used near Brackett Field and number of times used per year:

Hotel/Motel ____ Restaurant ____ Rental Car _____ Other _____

16. Your household income falls within which of the following ranges:

_____ Under $50,000

_____ $50,000 - $59,999

_____ $60,000 - $79,000

_____ $80,000 - $99,999

_____ Over $100,000

Please note that this last question will be helpful in the economic model used to project future-based aircraft.

Kindly return your completed questionnaire in the pre-addressed, stamped envelope.

THANK YOU FOR YOUR TIME TO PROVIDE US THIS INFORMATION.

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