TEHACHAPI MUNICIPAL AIRPORT MASTER PLAN UPDATE

Final Report

August 2004

Prepared for

City of Tehachapi

Respecting Our Past - Planning Our Future

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Prepared for:

City of Tehachapi, California

Prepared by:

The preparation of this document was financed in part through a planning grant from the Federal Aviation Administration as provided under the Airport and Airways Improvement Act of 1982. The contents of this report reflect the views of DMJM Aviation, which is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein, nor does it indicate that the proposed development is environmentally acceptable.

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SECTION 1
INTRODUCTION

SECTION 1
INTRODUCTION

BACKGROUND

Tehachapi Municipal Airport is owned and operated by the City of Tehachapi, California. The airport has served the aviation needs of the greater Tehachapi area since 1929 (Figure 1-1).

The last master plan for the airport was completed in 1987 (by Max B. Bacerra & Associates), during a period of strong growth in general aviation activity nationwide, particularly by single engine aircraft. After the late 1980s and early 1990s general aviation activity in the U.S. and at Tehachapi Municipal Airport declined.

The airport now faces new challenges and opportunities. The present Airport Master Plan Update addresses the important issues facing the airport today, and provides a plan to meet the needs of the general aviation community of the 21st century.

Figure 1-1
Tehachapi Municipal Airport

PROJECT OBJECTIVES

The overriding objective of the Master Plan Update is to prepare a document and set of plans that will provide the City of Tehachapi with a "roadmap" for the long-term development of the airport in a manner that is safe, meets long-term aviation needs, enhances the revenue-producing capability of the airport, is demonstrated to be financially sound, and meets environmental standards. The Master Plan Update will assist the City in providing facilities that serve present and future airport users in a way that will continue to be compatible with community development plans. It will ensure that the airport remain an important asset to the City of Tehachapi and promote economic growth of the area.

The airport plans are submitted to the FAA for approval and for FAA's use in evaluating grant requests and other actions involving the airport. Thus, the Master Plan Update provides guidance on the priority of airport development projects submitted to the FAA for funding. The FAA provided funding assistance for this master planning project.

The Master Plan Update also provides an important update to the Kern Regional Aviation System Plan prepared by the Kern Council of Governments in February 1998.

PROJECT APPROACH

The master planning objectives have been accomplished by following some fundamental steps that are recommended in FAA airport master planning guidelines. The initial step involved taking inventories of existing facilities and systems, documenting existing conditions, and coordinating activities with other agencies. Next, air traffic demand forecasts were prepared and used to identify required facilities. Then, requirements were compared with existing facilities to identify deficiencies. At this point in the planning process, land areas not needed for long-term aviation uses were identified. Revenue-producing aviation-compatible uses have been suggested for these areas.

Alternative development concepts that satisfy the aviation deficiencies and provide for economic development were prepared and evaluated so that a recommended concept can be identified. The recommended concept includes aviation development as well as revenue-producing development that is compatible with aviation. The detailed master plan of facility improvements, including a phased development plan and capital cost estimates, has been prepared based on the preferred development concept. The recommended development is presented for three planning periods: short-term (2003-2010), intermediate-term (2011-2015), and long-term (2015-2025). A financial plan has been prepared to demonstrate that the proposed development is financially sound. Land use and environmental studies were conducted to ensure that airport activity is not restricted by surrounding development and that surrounding development remains compatible with airport operations.

Summary of Tasks

The work program for the Tehachapi Municipal Airport Master Plan is organized according to the following study elements:

- Element 1 - Project Administration
- Element 2 - Inventory
- Element 3 - Forecasts of Aviation Demand
- Element 4 - Facility Requirements
- Element 5 - Airport Alternatives
- Element 6 - Airport Plans
- Element 7 - Financial Program

- Element 8 - Environmental Study
- Element 9 - Reports
- Element 10 - Coordination Meetings

Planning Issues

The Airport Master Plan Update for Tehachapi Municipal Airport focused on several issues important to the City and the long-term viability of the airport.

Needs of Airport Users. The first responsibility of the airport operator is to provide for the needs of the airport's users. These include airside needs such as runway condition, length, etc. and instrument approach capabilities, as well as landside needs such as hangars. It was important to establish the long-term land area needs for aviation so that land areas could be identified for aviation-compatible revenue-producing uses.

The Revenue Producing Development of Airport Property Not Needed for Aviation Uses. To ensure that the airport remains an important economic asset to the City and not be a financial burden, airport lands with no foreseeable aviation use can be planned for other airport compatible and revenue producing uses. These uses can be uses that encourage economic development in the Tehachapi area. The plan for such uses has been carefully crafted to be acceptable to the FAA, ensuring that revenue-supporting lands are not required for aviation uses for the long term and proposed uses are aviation-compatible. The plan for these areas includes roadway development options.

FAA Funding of Future Airport Projects. The master plan has adequately justified the need for airport improvement projects and structured improvement projects to maximize the eligibility for FAA funding.

Public and Agency Participation in the Planning Process and Support of the Plan. It is important that the public and affected government agencies have participated fully in the planning process. Working Papers, prepared during the project, have aided in informing the public and agencies, and afforded them the opportunity to comment on the findings as the study was conducted.

Financial Viability of the Airport. The airport master plan must ensure that the airport is not a financial burden to the City and its residents. To this end, all potential funding sources were evaluated.

Environmental Compliance and Land Use Compatibility. Airport plans must be compatible with surrounding land uses. Potential environmental concerns including aircraft noise and over-flights have been evaluated.

WORKING PAPERS

Six Working Papers were prepared during the project: at the completion of the inventory, forecasts, facility requirements, alternative concepts evaluation, financial and environmental tasks. Working Papers presented interim findings of the project and facilitated the review of study results by the City of Tehachapi, the Planning Advisory Committee and others. Each Working Paper contains one or more chapters, in draft form, of the complete Master Plan Update report.

Working Papers addressed the following topics:

- Working Paper 1 – Inventory of Existing Conditions: the current airport facilities and airport setting.
- Working Paper 2 – Forecasts of Aviation Demand: long-term forecasts of activity at the airport.
- Working Paper 3 – Airport Facility Requirements: airport facilities required to accommodate the projected long-term aviation demand.
- Working Paper 4 – Alternative Development Concepts: an identification and evaluation of alternative concepts for future development on the airport property.
- Working Paper 5 – Master Plans and Financial Plan: development plans, schedule, cost estimates and financial plan for the proposed airport improvements.
- Working Paper 6 – Environmental Evaluation: a review of potential environmental concerns associated with the proposed airport development.

A glossary with abbreviations used in this Master Plan Update has been provided as Appendix A.

SECTION 2
EXECUTIVE SUMMARY

SECTION 2
EXECUTIVE SUMMARY

This report documents the results of an Airport Master Plan Update study for Tehachapi Municipal Airport. The purpose of the study is to prepare a document and set of plans that will guide the City of Tehachapi in the long-term development of the airport property in a manner that is safe, environmentally sound and economically viable, while meeting the long-term needs of airport users. The Airport Master Plan addresses revenue-supporting uses on airport property not needed for aviation purposes, as well as facilities needed to meet a growing aviation demand. The important findings and recommendations of the study are summarized below, referenced to the remaining sections of this report.

EXISTING FACILITIES (SECTION 3)

- Tehachapi Municipal Airport is located in southern Kern County, California approximately 36 miles southeast of Bakersfield and 16 miles northwest of Mojave in the northern portion of the city of Tehachapi. State Route 58 north of the airport provides freeway access.

- The airport began operations as an unimproved dirt runway in 1929. It was transferred to Kern County in August of 1938. On November 3, 1980 the airport was transferred to the City of Tehachapi.

- Presently Tehachapi Municipal Airport serves the general aviation community in the Tehachapi area. It is an alternate airport for cargo aircraft from DHL, UPS, and Federal Express when Bakersfield is fogbound. The airport is also used to transport inmates to and from the California Correctional Institution and for transporting patients to nearby medical facilities.

- Facilities at the airport include the following:

  - A lighted 4,035-foot runway, designated Runway 11-29.
  - A parallel taxiway on the south side of the runway.
  - A Precision Approach Path Indicator (PAPI) visual approach slope aid.
  - An administration / terminal building.
  - A rotating beacon, indicating the airport's location.

- A total of 54 aircraft parking spaces operated by the City for based and transient aircraft.
- Individual aircraft storage hangars numbering 57.
- Fuel storage capacity of 12,000 gallons for aviation gas.

- General aviation services are provided by two Fixed Base Operators (FBOs), Benbow Aviation and Mountain Hawk Aviation.

- In July 2002, there were 67 aircraft based at the airport. Aircraft operations (takeoffs and landings) were estimated to be 11,000 in 2001.

- There is an existing industrial park in the southwest corner of the airport.

- There are approximately 145 acres of undeveloped airport property on the north side of the runway.

AVIATION FORECASTS (SECTION 4)

- Tehachapi Municipal Airport serves aviation users in the Tehachapi Mountains area between Bakersfield and Mojave. The area includes the incorporated city of Tehachapi as well as the unincorporated communities of Golden Hills, Stallion Springs, Bear Valley Springs, and Old Town.

- The based aircraft forecast were developed by estimating a future rate of based aircraft per thousand residents, then applying population growth rates for the airport service area. The resulting forecast in based aircraft is an increase from 67 in 2002 to 80 in 2010, 89 in 2015, and 109 in 2025.

- In 2025 the mix of aircraft is expected to remain relatively unchanged from today – approximately 94 percent single engine piston and 6 percent multi-engine piston aircraft (Table 2-1).

- Total annual operations were projected on the basis that the number of operation per based aircraft experienced recently will remain the same. In 2001/2002, the airport averaged 164 operations per based aircraft. A ratio of 164 operations per based aircraft is projected to continue through 2025. The resulting aircraft operations forecast is 13,100 in 2010, 14,600 in 2015, and 17,900 in 2025 (Table 2-1).

Table 2-1
Based Aircraft and Operations Forecasts
For Tehachapi Municipal Airport, 2001/2002 to 2025

Item	Actual 2001/ 2002 [a]	Forecast [b]		
		2010	2015	2025
Based Aircraft				
Single Engine Piston	63	75	83	102
Multi Engine Piston	4	5	6	7
Total Based Aircraft	67	80	89	109
Aircraft Operations				
Operations per Based Aircraft	164	164	164	164
Percent Local Operations	41%	41%	41%	41%
Local Operations	4,500	5,400	6,000	7,300
Itinerant Operations	6,500	7,700	8,600	10,600
Total Operations	11,000	13,100	14,600	17,900

[a] Sources: Survey by DMJM Aviation and airport records. Actual based aircraft are for 2002; actual operations are estimated for 2001.
[b] Source: DMJM Aviation analysis.

FACILITY REQUIREMENTS (SECTION 5)

- The present airfield has the capacity for 230,000 annual operations and 98 hourly operations, which will easily accommodate the projected demand through the planning period (17,900 annual and 9 peak hour operations in 2025). It is concluded that airfield (runway/taxiway) improvements are not needed for the purpose of increasing airfield capacity.

- The existing runway provides a 97.7 percent average annual coverage for a 10.5-knot crosswind, based on available surface wind data collected at the airport. This meets FAA recommendations for wind coverage.

- The recommended runway lengths for small airplanes (less than 12,500 pounds) with approach speeds of 50 knots or more and less than ten passenger seats for conditions at Tehachapi range from 3,930 to 5,460 feet. This is the category of aircraft predominantly using the airport now and expected to use the airport in the future. The Runway 11 and 29 takeoff lengths of 4,035 feet satisfy the requirements for over 75 percent of these aircraft.

- Runway 11-29 has a rated pavement strength of 25,700 pounds gross weight with single-wheel landing gear configurations. This is sufficient to accommodate all anticipated aircraft.

- The Runway Protection Zone (RPZ) is an area at the end of a runway that provides for the unobstructed passage of aircraft through the airspace above it, and is used to enhance the protection of people and property on the ground. Control of the RPZs by the airport owner is strongly encouraged by the FAA to prohibit unsafe uses within the RPZs. While the land uses in the present RPZs generally conform to FAA standards, not all the RPZ property is controlled by the City. It is recommended that the City obtain easements for RPZ areas not now controlled by the City.

- Currently, the FAA is in the process of evaluating the feasibility of a GPS approach at the airport, including the establishment of approach minimums if a GPS approach is possible.

- The option to build a new administration/terminal building at some future time should be provided for. The master plan identifies a site for a new administration building to ultimately replace the existing building.

- The projected hangar demand represents a need to add a net of 11 additional hangars between now and 2010, another 8 between 2011 and 2015, and another 17 from 2016 to 2025.

- The need for based and transient aircraft parking spaces is expected to increase from a total of 28 in 2002 to 48 in 2025.

ALTERNATIVE DEVELOPMENT CONCEPTS (SECTION 6)

- The goal of the concept alternatives analysis was to identify the appropriate airport development that best satisfies the following criteria:

  - Long term aviation needs
  - Safety of aircraft operations
  - Community and environmental compatibility
  - Flexibility to accommodate change
  - Efficiency of construction phasing and operations
  - Relative financial effectiveness

- Several airside issues were evaluated – runway safety zones, potential instrument approach procedures, location of the Runway 29 displaced threshold, and the separation of the runway and the existing parallel taxiway.

  - The existing airfield configuration does not allow for the standard Runway Safety Areas (RSAs) or Runway Object Free Areas (ROFAs) between the stopway ends and airport property. The stopways were constructed to allow the runway to be used for a specific corporate jet use. That user is no longer at the airport, and the stopways now have a limited usefulness. Therefore, it is recommended that the existing stopway pavement remain to provide a safety margin but no longer be designated as stopway, and standard RSAs and ROFAs be provided at the existing runway ends.

  - Planning for new airport buildings should protect for a future instrument approach procedure. A future building restriction line (BRL) located 350 feet from the relocated runway centerline is recommended to protect for a non-precision instrument approach procedure. The future BRL would allow a building 14 feet high at the BRL to meet the Federal Aviation Regulations Part 77 height criteria for runways with a straight-in non-precision instrument approach procedure.

  - The Runway 29 threshold is currently displaced 550 feet, which was necessary because of utility poles that were east of the Runway 29 end. Several poles which were critical obstructions were recently removed, allowing the amount of displacement to be reduced now. A threshold siting analysis was done following FAA methodology and Caltrans guidelines. From this analysis, it has been concluded that the Runway 29 threshold can now be relocated to 375 feet from the runway end and meet the FAA threshold siting criteria for a visual runway

  - The separation of the runway and south parallel taxiway is 110 feet. The separation is being increased to 122.5 feet with the widening of the runway. The FAA's standard for this airport is 150 feet. It is recommended that the Master Plan provide for eventually relocating the taxiway centerline an additional 27.5 feet to the south while continuing to meet the standards for taxiway-taxilane separation at the east end and separation between taxiway and objects at the west end (such as parked airplanes and buildings).

- Three initial aviation landside development options were evaluated, which varied with respect to shape and size of the area set aside for revenue-supporting uses. The relative opportunities and constraints of each revenue-supporting area were evaluated to determine the location for revenue-supporting uses that would be most attractive for leasing. The revenue-supporting area chosen was the one that maximizes revenue-supporting land at the intersection of SR58 and Dennison Road and along Dennison Road. All airport property west of Tehachapi Hill and adjacent to the runway is to be reserved for aviation uses. The remainder of property north of the runway will be dedicated to revenue-supporting uses.

- Refined aviation landside development concepts were evaluated, with all aviation development located in the aviation use area chosen. Many land use options and configurations were considered for development of this aviation use area. The recommended Master Plan concept is illustrated in Figure 6-4 in Section 6. The concept plan shows aviation development in four phases, corresponding to the time periods for the forecasts and facility requirements: Phase 1 (2003 to 2010), Phase 2 (2011 to 2015), Phase 3 (2016 to 2025), and Phase 4 (areas reserved for aviation uses after 2025).

- Alternatives were analyzed for the development of the portion of airport property identified as revenue-supporting property on the northeast corner of the airport. This parcel will not be required for aviation uses and therefore can be developed for uses that provide revenue to support the airport operation. The proposed revenue-supporting development concept, illustrated in Figure 6-11, contains a land use plan, circulation plan, and important design features that respond to the needs of the City and the constraints and opportunities of the site. The grid layout approach will position the property for development with the maximum ability to adapt to a multitude of users. The concept offers flexibility for the future, with the potential to phase infrastructure improvements as needed and to build or not build, certain street segments based on the requirements of future tenants.

AIRPORT PLANS (SECTION 7)

- The Tehachapi Municipal Airport Master Plan development program is summarized below and illustrated in Appendix C on a set of nine plans, which have been reduced from large-scale sheets. The overall development plan, including airside and landside improvements is shown on the Airport Layout Plan. The Building Area Plan and Revenue-Supporting Area Plan provide greater detail of the primary development areas. The Part 77 Airspace Plan and Part 77 Approach Surfaces depict the imaginary surfaces on and around the airport that could potentially affect airport operations, as provided in Federal Aviation Regulations (FAR) Part 77. The Runway Protection Zone (RPZ) Plan illustrates land uses and facilities within the RPZ areas. Land uses and noise contours surrounding the airport are shown in the Off-Airport Land Use Plan. The Airport Property Map gives the acquisition history of airport property.

- The proposed Master Plan improvement projects by phase are:

  – Phase 1 Improvements (2003 to 2010)

    - Widen and strengthen runway and relocate displaced thresholds (2003).
    - Prepare hanger sites at southwest corner for lease (2003-2004).
    - Modify storm water basin southwest of Runway 11 (2003-2004).
    - Resurface taxiway and apron pavement (2003-2005).
    - Provide airport security system improvements ((2004).
    - Install Automated Weather Observing System (AWOS) (2004).

- Provide compass calibration pad and supplemental wind cone for Runway 29 (2004).
- Install PAPI/PLASI on Runway 11 (2004-2005).
- Install REILs on Runways 11 and 29 (2004-2005).
- Extend Alan Avenue west of Dennison Road for north side airport access (2005-2006).
- Construct partial north side parallel taxiway, runup apron, connecting taxiways, and parallel taxiline (2005-2006).
- Construct nine hangers on north side of runway (2006-2007).
- Construct Service Road, 20-feet wide (2006-2007).
- Acquire aviation easements for runway protection zone (RPZ) areas (2008-2009).

– Phase 2 Improvements (2011 to 2015)

- Extend north side airport access road to the west (Alan Avenue).
- Extend partial north side parallel taxiway and taxilane and construct connecting taxiways.
- Construct eight hangers on north side of runway.
- Prepare FBO site for lease.
- Construct storm water detention basin north Runway 11 (see 2001 Drainage Study).
- Construct Drainage Improvements on the south airport perimeter (see 2001 Drainage Study).
- Provide fire protection for aircraft parking aprons on the south side.

– Phase 3 Improvements (2016 to 2025)

- Construct drainage improvements on the south parallel taxiway (see 2001 Drainage Study).
- Relocate south parallel taxiway 150 feet from runway centerline.
- Install MITL taxiway lights on south parallel and connecting taxiways.
- Construct 17 hangers on north side of runway.
- Extend partial north side parallel taxiway and taxilane to west end and construct connecting taxiways.
- Extend north side airport access road to the west.
- Construct airport terminal/administration building, including transient parking.
- Prepare aviation industrial site for lease.

FINANCIAL PLAN (SECTION 8)

- Aviation development costs are shown for three phases of development: Phase 1 (2003 – 2010), Phase 2 (2011 – 2015), and Phase 3 (2016 – 2025). Although airport improvements are planned according to these phases, development at the airport will not occur unless needed to accommodate aviation demand. Construction could happen earlier or later than

estimated here, depending on future needs and the availability of FAA grants and other sources of funding. Twenty-nine projects costing an estimated $9.4 million (in constant 2003 dollars) are included in the Master Plan Capital Improvement Program.

- Master Plan project costs were allocated among federal, state and local sources under the following assumptions and criteria: (1) all FAA Airport Improvement Program (AIP) eligible projects will be funded at their maximum eligible level; (2) California Aid to Airports Program (CAAP) Matching Grants will be used to fund the maximum five percent share of FAA AIP grants; (3) the balance of project costs were assigned to local responsibility.

- At the local level, project cost shares were further allocated among three funding sources: loans; private capital; and City/airport contributions. Loans (either through the CAAP Loan Program or some other source) were assumed to be used to fund a portion of future hangar development. Private capital was assumed to be used for the improvement of hangar sites and preparation of the aviation industrial site. The balance of project costs was assumed to be funded through City/airport contributions.

- Several potential airport revenue enhancements may provide additional revenues that could be used to fund future airport development. These potential revenue enhancements include:

  - Lease of airport revenue-supporting property. The recommended Airport Master Plan includes development of a portion of the northeast corner of the airport as revenue supporting uses. The Plan identifies approximately 53 acres of developable property. Assuming the airport ground-leased the property and that the site developer provided private capital to improve and market the property, the airport could potentially receive between $20,000 and $120,000 per year in lease revenues from this site. These estimates are preliminary and actual revenues would be dependent on the absorption of the leasable property and the actual ground-lease rate realized from the agreements. The marketability of the property, timing of leasing, as well as the actual ground lease rates need to be identified through future market and financial feasibility analyses.

  - Adjustment to aviation ground lease rates and terms. Two changes could be made to the lease agreements that would potentially increase airport revenue and asset value: (a) airport ground lease agreements might include a periodic adjustment to the lease rate based on the appraised fair market value to ensure that the ground lease rates accurately reflect the value of the land, and (b) airport ground lease agreements should include a reversionary clause specifying that tenant improvements revert to the airport at the end of the lease period.

- The schedule of Master Plan improvement costs (in constant 2003 dollars) by phase and source under these assumptions and criteria are summarized in Table 2-2. In summary, the $9.4 million, in constant 2003 dollars, Master Plan capital improvement program is anticipated to be funded by FAA AIP grants ($6.7 million – 71 percent of the total); State CAAP grants ($0.3 million – 4 percent of the total); loans ($0.8 million – 9 percent of the total); private capital ($0.1

million – 1 percent of the total); and City/airport contributions ($1.5 million – 16 percent of the total).

Table 2-2
Summary of Capital Improvement Program Funding
By Phase and Source

Source	Cost (in millions) Phase I	Phase II	Phase III	Total	Percent of Total
Federal Grants	$ 2,476.0	$ 1,545.9	$ 2,632.3	$ 6,654.2	71.0%
State Grants	125.1	77.3	131.6	334.1	3.6%
Local					
Loans	180.0	225.0	380.0	785.0	8.4%
Private Capital	79.0	22.0	21.0	122.0	1.3%
City/Airport Contributions	393.9	283.8	794.1	1,471.7	15.7%
Total	$ 3,254.0	$ 2,154.0	$ 3,959.0	$ 9,367.0	100.0%

Source: DMJM Aviation.

ENVIRONMENTAL EVALUATION (SECTION 9)

- There are no recent Community Noise Equivalent Level (CNEL) contours developed for the airport. However, since the operation forecasts for 1998 in the 1987 Airport Master Plan are very similar to the forecasts for 2025 in this Airport Master Plan Update, it is anticipated that the 2025 operation forecasts would have similar CNEL contours. The 1998 CNEL contours from the 1987 Airport Master Plan are illustrated in the Noise Element of the City's General Plan, which indicates that the 65 dBA CNEL contour is anticipated to extend slightly south of airport property at midfield but is not anticipated to include any residential units. Thus, there would not be any adverse noise impacts.

- According to the Land Use Element of the City's General Plan, the airport is located in an area designated for Light Industrial (LI). The City encourages redevelopment plans within LI areas to promote economic vitality and aesthetic values. These plans may include provisions

for mixed uses, aviation easements, buffers, and design standards to improve the aesthetic and economic development. The existing zoning for the airport use is LI, which is consistent with the General Plan designation. Therefore, airport improvements would be considered compatible with the existing land use.

- No other environmental constraints due to the proposed airport development were identified in the environmental evaluation, which covered the following topics in addition to those discussed above:

  - Social Impacts including Environmental Justice
  - Air Quality
  - Water Quality
  - Wetlands
  - Floodplains
  - Wild and Scenic Rivers
  - Coastal Barriers
  - Farmlands
  - Light Emissions
  - Coastal Zone Management
  - Historic, Architectural, Archeological and Cultural Resources
  - DOT Act, Section 4(f)
  - Energy Supply and Natural Resources
  - Biotic Communities
  - Endangered and Threatened Species of Flora and Fauna
  - Solid Waste Impacts
  - Construction Impacts
  - Induced Socioeconomic Impacts

- The following additional environmental studies are recommended: (1) a database search of historic and cultural resources and (2) a biological assessment to establish if any wildlife or plants of value exist on the site.

SECTION 3
INVENTORY OF EXISTING CONDITIONS

SECTION 3
INVENTORY OF EXISTING CONDITIONS

This section documents the number, type and general description of the existing facilities at Tehachapi Municipal Airport. Current airport activity is also described. This inventory of facilities and activity provides the baseline for comparing existing capacities with future requirements to establish needs.

The following subsections describe the airport including the airport location, history and role; the airfield; airspace; navigational aids (navaids); airport landside facilities; utilities; airport tenants and services; and airport activity.

AIRPORT LOCATION, HISTORY AND ROLE

Airport Location

Tehachapi Municipal Airport is located in southern Kern County, California approximately 36 miles southeast of Bakersfield and 16 miles northwest of Mojave in the northern part of Tehachapi (Figure 3-1). The airport is in Tehachapi Valley, with El Tejon Mountains to the northwest and the Tehachapi mountains to the southeast. State Route 58, north of the airport, provides freeway access (Figure 3-2).

The Tehachapi area has a rich and diverse history which is intertwined with the Union Pacific Railway directly south of the airport. The single largest employer in the Tehachapi area is the California Correctional Institution, which is located approximately seven miles southwest of the airport. Tehachapi is also known for its agricultural, wind generation, and cement producing industries.

History of the Airport[1]

The airport was originally conceived in 1929 by Guido Martini and his partners. This unimproved dirt runway was shared with golfers. This partnership, in August of 1938, deeded

[1] Source: The Tehachapi News.

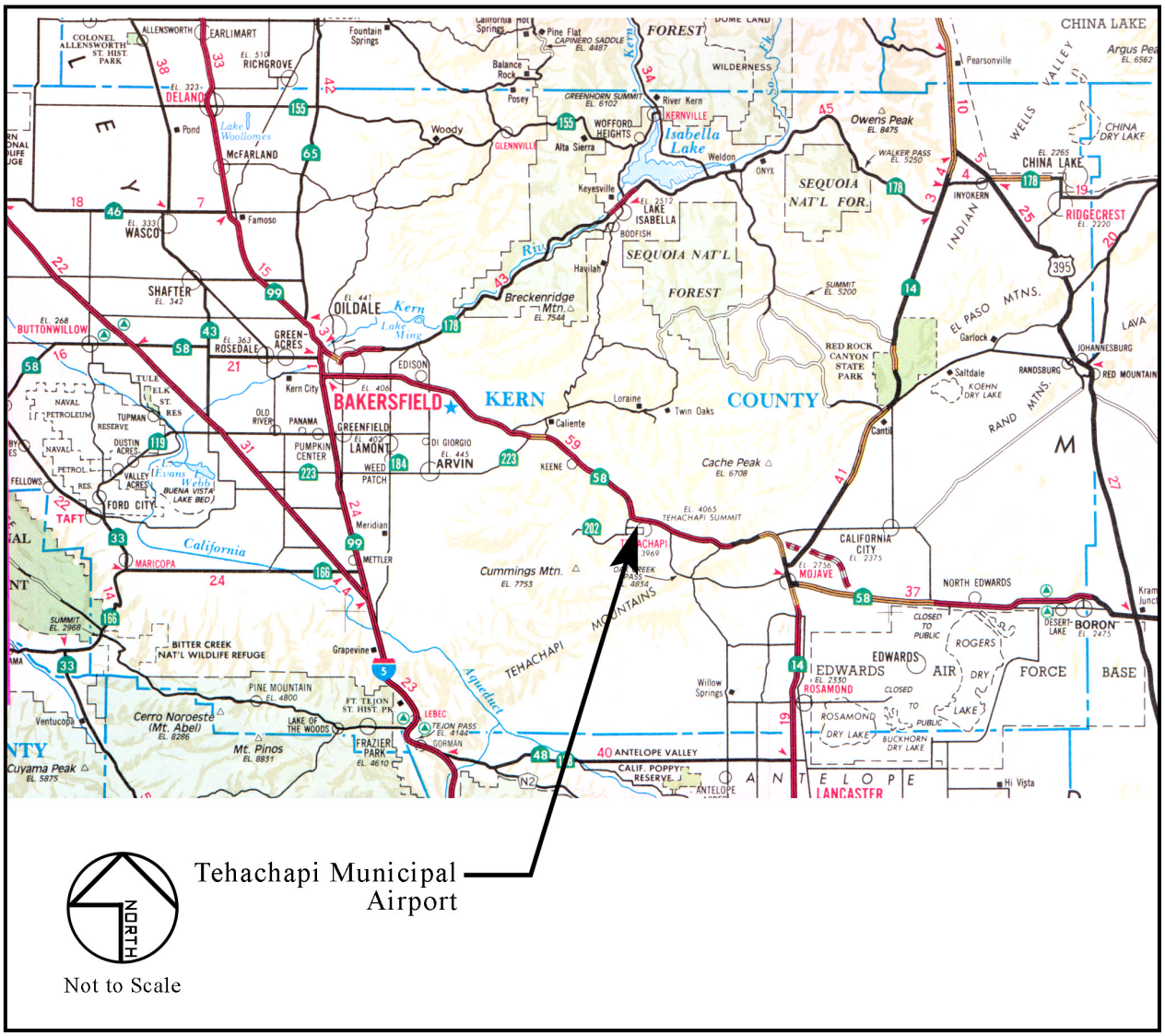

Figure 3-1
Airport Location

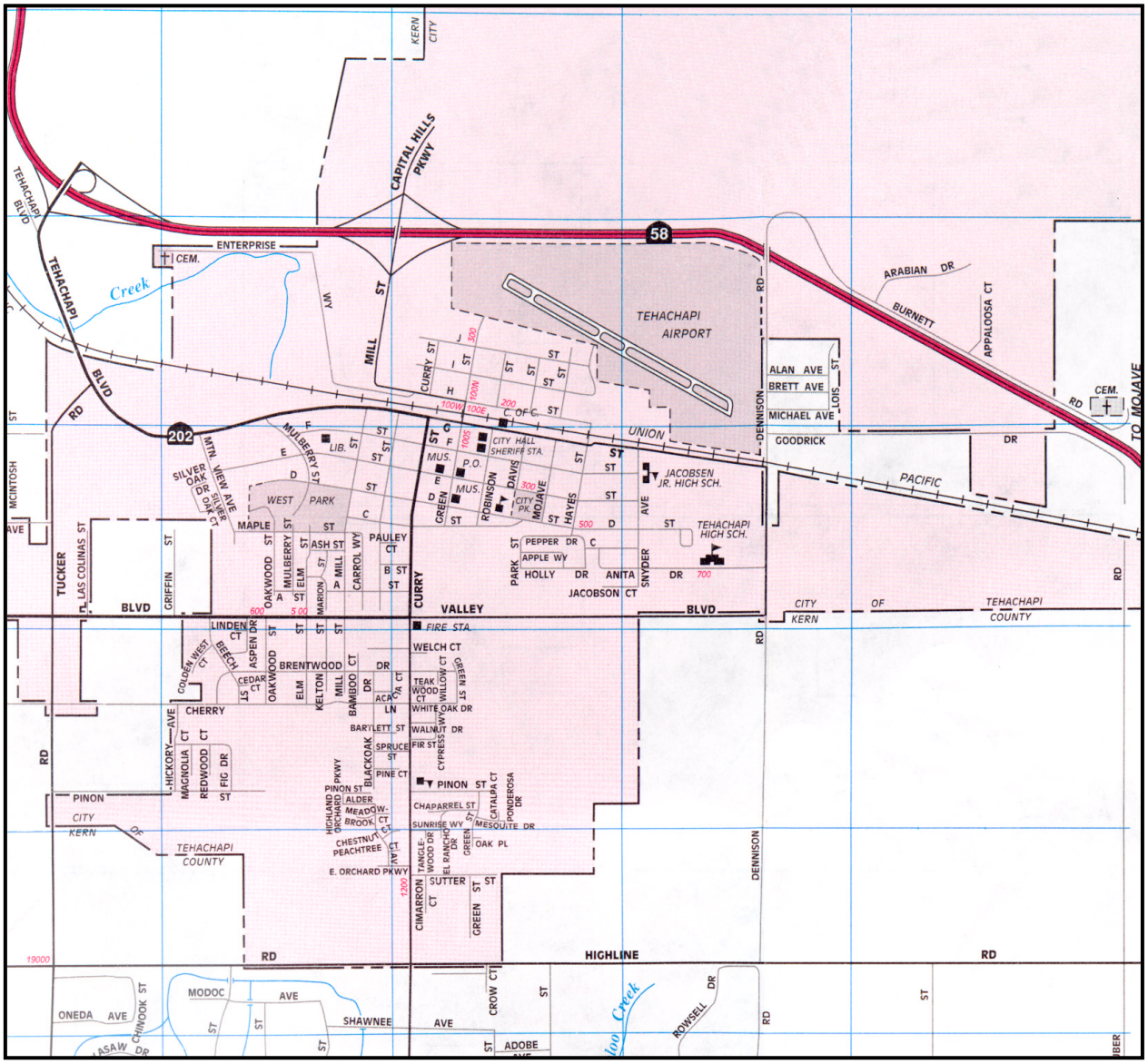

Figure 3-2
Airport Vicinity

130 acres of land to Kern County. An additional 30 acres was subsequently deeded as airport-related property.

May 19, 1938 was the date of the first air mail flight between Bakersfield and Tehachapi. This historic flight was completed by Harry Beauford Jr.

In 1939 the first hangar was built at the airport for Don Frahm. Frahm provided airplane rides to the public. At this time there were no houses or fences near the airport.

On July 21, 1952, a 7.7 earthquake isolated Tehachapi from the outside world for several weeks. The airport was the city's only means of transportation. Daily flights provided mail service, food and medical supplies, and work crews to assist with the cleanup.

In the 1960s the California Department of Transportation dedicated 13 acres of land on the north side of the airport. Other improvements included asphalting the 4,035 foot long runway, installing runway lights, a rotating beacon, and a paved aircraft parking ramp.

On November 3, 1980 the airport was transferred to the City for $11,918 in land value and $155,000 in fixed assets. This transfer stipulated the land is for airport use only and would be reverted to the County otherwise. Subsequently, approximately 50 privately-owned hangars were constructed. The runway was also resurfaced and an automated self-service fuel system installed. A small airport industrial park was developed to provide revenue to sustain airport operations.

Airport Role and Classification

Presently Tehachapi Municipal Airport serves as a reliever airport for cargo aircraft from DHL, UPS, and Federal Express when Bakersfield is fogbound. The cargo is then handled by ground transportation near the airport. The airport is used to transport inmates to and from the California Correctional Institution. At times the airport is used to transport patients to nearby medical facilities. Several local business people commute to and from work by air on a regular basis. The runway can accommodate small commuter planes but not large commercial jets.

Tehachapi Municipal Airport is a public-use airport, being open to the public and serving transient aircraft, those airplanes not based at the airport, as well as airplanes based there.

National Plan of Integrated Airport Systems. The National Plan of Integrated Airport Systems (NPIAS) identifies over 3,300 airports that are significant to national air transportation. A primary purpose of the NPIAS is to identify airports that are eligible to receive grants under the Airport Improvement Program (AIP). The NPIAS is composed of all commercial service airports, all reliever airports, and selected general aviation airports.[2]

[2] Federal Aviation Administration, National Plan of Integrated Airport Systems (1998-2002), March 1999.

Tehachapi Municipal Airport is included in the NPIAS as a "general aviation airport." The nation's 2,472 general aviation airports are designated by the FAA as having the function of serving a community that does not receive scheduled commercial air service.[3]

California State Aviation System. The aviation function of the California Department of Transportation as described in State statute is to: "assist in the development of an air transportation system that is consistent with the needs and desires of the public, and in which airports are compatible in location with, and provide services meeting, statewide and regional goals and objectives" (Section 14000.5 (c), California Government Code). The California Aviation System Plan (CASP) is the vehicle by which the California Department of Transportation implements this directive.

Tehachapi Municipal Airport is classified in the CASP as a "regional airport." It is one of 16 general aviation airports classified as such in the Central California region consisting of Yuba, Sutter, Yolo, Placer, Sacramento, San Joaquin, Stanislaus, Merced, Madera, Fresno, Tulare, Kings, and Kern Counties.

FAA Airport Classification. The Airport Layout Plan (ALP) dated December 3, 1993 indicated no Airport Reference Code (ARC). However, the airport generally satisfies standards for B-I small airplanes exclusively. This category includes aircraft with approach speeds of 91 knots or more but less than 121 knots and wingspans less than 49 feet. Aircraft in this category are primarily single-engine airplanes (such as the Beech Bonanza and Cessna 172) and twin-engine piston airplanes (such as the Beech Baron and Cessna 402).

RUNWAY/TAXIWAY SYSTEM

Runway

The airport has a single runway, designated Runway 11-29 (Figure 3-3). The runway is of asphalt construction and is 4,035 feet long and 50 feet wide. The Runway 11 threshold is displaced (i.e., the approach end of the runway for landing purposes is not at the runway end) approximately 300 feet to allow clearance of the approach surface over a hill northwest of the airport. The Runway 29 threshold is displaced approximately 535 feet. The threshold was previously displaced to allow clearance of the approach surface over power poles that were adjacent to Dennison Road. The power lines that necessitated the displaced threshold have been removed.

[3] Federal Aviation Administration, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS), FAA Order 5090.3C, December 4, 2000.

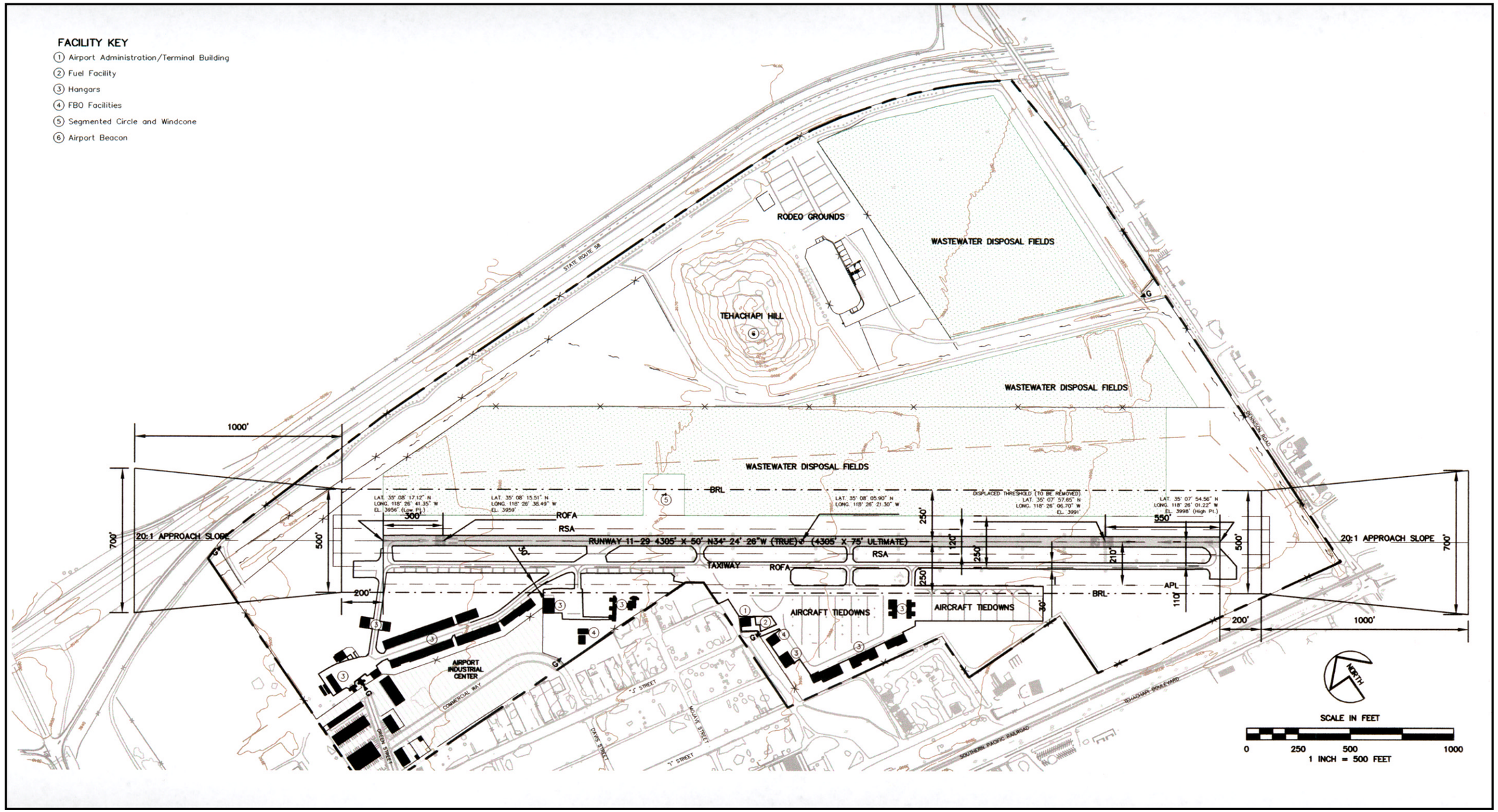

Figure 3-3
Existing Airport Facilities

There are stopways at each end of the runway. A stopway is a rectangular surface beyond the end of a runway that can be used by an airplane in an aborted takeoff. The stopways are approximately 600 feet long at the Runway 11 end and 390 feet at the Runway 29 end.

The true bearing of the runway is North 55° 36' 41" West (i.e., about 55.6 degrees west of true north). The established airport elevation, defined as the highest point along any of an airport's runways, is 3,998 feet mean sea level (MSL). The runway high point is at the Runway 29 end. The overall runway gradient is 1 percent, sloping up to the northeast.

The runway pavement strength was rated in the past to handle a maximum certified aircraft weight of 25,700 pounds[4] for aircraft with single-wheel landing gears. The runway pavement is presently in poor condition with significant cracking. There is a project in progress, funded by the FAA to resurface the runway and widen it by 25 feet on the north side to a width of 75 feet.

Runway 11-29 is equipped with high intensity runway edge lights (HIRL). The Runway lights are activated by the pilot on approach. Threshold lights indicate the location of the displaced threshold for Runway 29.

Runway 11 and 29 are marked with visual markings. For general aviation airports without turbojet operations, these typically include centerline, designator (runway number), and threshold markings. The runway has all these markings. Each runway end is also marked with displaced threshold markings.

A segmented circle and lighted wind sock are located north of the runway at approximately half way between midfield and the Runway 11 displaced threshold. The segmented circle indicates the airport traffic pattern. Tehachapi Municipal Airport operates with a non-standard right traffic pattern for Runway 11 and a standard left pattern for Runway 29. These traffic patterns are due to the mountainous terrain north of the airport. The preferential runway is Runway 29 (landings from the east and departures to the west) and is used for approximately 65 percent of the operations. Runway 11 is used when required by winds and other conditions.

Taxiways

The runway is served by full parallel taxiway on the south side, which is 30 feet wide, and provides access to all airport facilities (Figure 3-3). The centerline-to-centerline separation of the runway and taxiway is a non-standard 110 feet. In order to satisfy FAA design criteria for the B-1 (small airplanes exclusively) category, the separation needs to be 150 feet. The runway is served by one 45 degree and two right-angle exit taxiways, and entrance taxiways at each end of the runway. The taxiways are unlit. However, the parallel taxiway has reflectors.

The taxiway pavement is in need of repair and resurfacing. The airport has obtained a second grant from the FAA to fund the repair and resurfacing of taxiways and aircraft parking areas.

[4] Source: Airport Layout Plan, Tehachapi Municipal Airport, December 3, 1993.

NAVIGATIONAL AIDS AND INSTRUMENT PROCEDURES[5]

Visual Aids

The airport is equipped with the following visual aids to assist pilots in making approaches and locating the runway at night or during periods of reduced visibility.

Precision Approach Path Indicator (PAPI) on Runway 29. Runway 29 has a one-box PAPI set at a 3.5^{o} glide path. The PAPI provides vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is "on path" if he sees both red and white, "above path" if only white, and "below path" if only red.

Rotating Beacon. A rotating beacon is 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 Tehachapi Municipal Airport is located on top of Tehachapi Hill, is lighted with an obstruction light, and meets current FAA specifications.

Instrument Approach Procedures

An instrument approach procedure is a series of predetermined maneuvers for the orderly movement 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.

There are two types of instrument approach procedures: precision and non-precision instrument approaches. A precision approach procedure is one in which an electronic glide slope 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.

Presently there are no instrument approach procedures for the airport. The installation of a non-precision GPS approach has been proposed by the City and is being evaluated by the FAA. The GPS approach requires the airport to have runway and airfield signage which is not currently installed at the airport and to meet other airport design standards.

[5] See Appendix A for definitions of navigational aids and other aviation terms.

OTHER AIRFIELD FACILITIES AND FLIGHT SERVICES

Automated Weather Observing System

The airport has a project pending to install an Automated Weather Observing System (AWOS). The AWOS will provide pilots with information on wind speed and direction, temperature, visibility, and cloud height, which is continually updated.

Flight Services

UNICOM services are provided on a published frequency by the city of Tehachapi. This service provides local traffic pattern advisories but is not used for air traffic control purposes.

Assistance from the Rancho Murrieta Flight Service Station (FSS) is available by telephone to pilots at the airport. The services provided by the FSS include:

- Issuance of Notices to Airmen (NOTAMs)
- Dissemination of Pilot Reports (PIREPs) to interested parties
- Issuance of weather data
- Direction finding assistance to "lost" aircraft
- Pilot briefing service
- Flight plan assistance

AIRSPACE AND AIR TRAFFIC CONTROL

The existing system of controlled airspace, enroute airways, navigational aids, and airports located in the vicinity of Tehachapi Municipal Airport is depicted on Figure 3-4.

Area Airports

Four public-use general aviation airports (Mountain Valley, Mojave, Rosamond, and California City Airports) and nine private airports (Kelen, Lloyds, Flying S Ranch, Kelso Valley, Skyotee Ranch, J&J Crop Dusters Inc., Di Giorgio Ranch Landing Strip, Little Buttes Antique Airfield, and Paradise Lakes) are within 25 nautical miles of Tehachapi Municipal. See Table 3-1 for data concerning these facilities.

Controlled Airspace

Figure 3-4 shows controlled airspace areas that exist in the vicinity of Tehachapi Municipal Airport. “Controlled airspace” is a generic term that encompasses the types of airspace specified

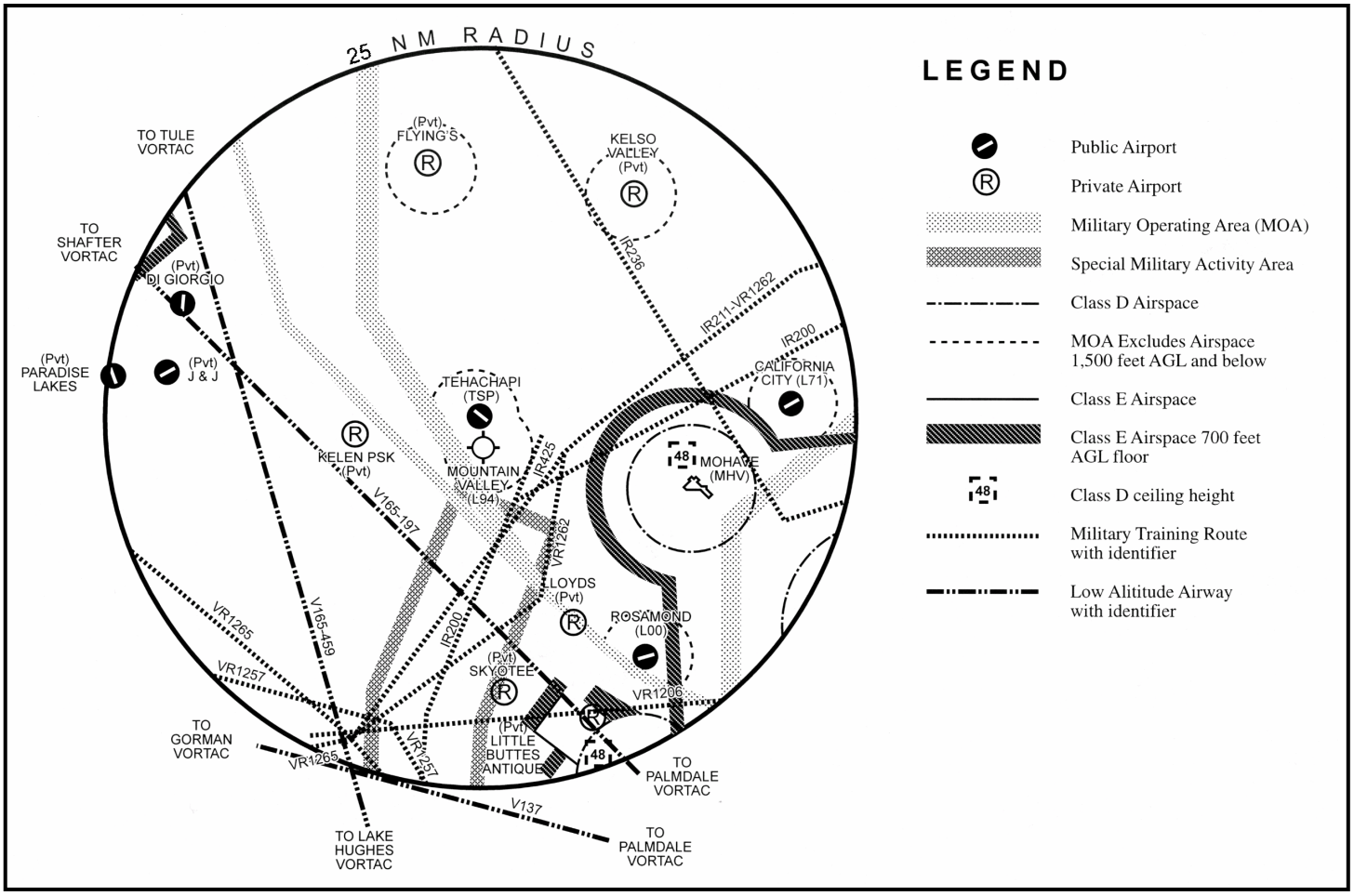

Figure 3-4
Airspace in the Vicinity of Tehachapi Municipal Airport

Table 3-1
Public Use Airports in the Vicinity of
Tehachapi Municipal Airport

Airport	Nautical Miles from Tehachapi	Runways	Runway Surfaces	Ownership	Based Aircraft	Individual Hangars	Fuel	Maintenance	Control Tower
Tehachapi	-	11-29(4,035')	Asphalt	Public	67	57	100LL	Major	No
Mountain Valley	2	9L-27R(5,190')	Gravel	Public	80 [b]	14	80	Major	No
		9R-27L(5,420')	Gravel						
Kelen	8.2	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
Lloyds	15	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
Mojave	15.3	4-22(4,743')	Asphalt	Public	200	75	100LL/Jet A	Major	Yes
		8-26(7,050')	Asphalt						
		12-30(9,600')	Asphlt-Conc						
Flying S	17.1	7-25(3,750')	Dirt	Private	8	[a]	[a]	None	No
Kelso Valley	18.1	4-22(2,600')	Dirt	Private	0	[a]	80/100LL	None	No
		16-34(3,000')	Dirt						
Skyotee	18.1	7-25(2,600')	Dirt	Private	0	29	[a]	[a]	No
Rosamond	18.9	7-25(3,600')	Asphalt	Private	70	40	100LL	[a]	No
California City	20.3	6-24(6,025')	Asphalt	Public	65	49	80/100LL/Jet A	Minor	No
J&J	21	7-25(2,500')	Asphalt	Private	3	[a]	[a]	[a]	No
Di Giorgio	21.2	17-35(2,600')	Asphalt	Private	0	[a]	[a]	None	No
Little Buttes Antique	21.4	6-24(2,900')	Turf	Private	9	[a]	[a]	[a]	No
Paradise Lakes	24.6	16-34(2,700')	Asphalt	Private	3	[a]	[a]	[a]	No

Note: NA = Not applicable.

Source: DMJM Aviation analysis of FAA Form 5010-1

[a] Data not available.

[b] Gliders are 95% of the based aircraft.

in Federal Aviation Regulations (FAR) Part 71, within which air traffic control service is provided.

Controlled airspace is generally associated with relatively high levels of air traffic and airspace congestion, and requires pilots operating within it, to comply with operating rules and procedures beyond those associated with flight in uncontrolled airspace. Types of controlled airspace, including those shown on Figure 3-4, are as follows:

Class B Airspace. Class B airspace is defined as the airspace surrounding the nation's busiest airports in terms of aircraft operations or passenger enplanements. The configuration of Class B airspace is individually tailored, but generally consists of a surface layer and two or more additional vertical layers designed to contain all published instrument procedures associated with an airport. All aircraft that operate within Class B airspace must obtain air traffic control clearances to do so and receive separation services within the airspace. In addition, they are required to carry certain communications equipment (e.g., Mode C transponders) to ensure that they can be monitored by air traffic controllers. Because of these communications, control, and equipage requirements, many pilots of lower performance, general aviation aircraft, choose to operate outside of or under Class B airspace.

There is no Class B airspace in the vicinity of Tehachapi Municipal Airport.

Class C Airspace. Class C airspace consists of the airspace surrounding airports that have an operational airport traffic control tower (ATCT), are served by a radar approach control facility, and accommodate minimum levels of aviation activity as specified by the FAA.[6] Like Class B airspace, Class C airspace is individually tailored for the airport it serves, but generally consists of a surface area with an additional layer above it, resembling an upside-down wedding cake. Pilots are required to establish two-way radio communications with the ATC facility providing air traffic services prior to entering Class C airspace and must maintain those communications while in the airspace. Within Class C airspace, air traffic controllers are required to separate aircraft operating under visual flight rules (VFR) from aircraft operating under instrument flight rules (IFR), but are not required to separate VFR operations from one another.

There is no Class C airspace in the vicinity of Tehachapi Municipal Airport.

Class D Airspace. Class D airspace consists of the airspace surrounding airports that have an operational ATCT, but does not meet the other requirements necessary to be designated as Class C airspace. Class D airspace is individually tailored for each airport, but generally consists of a single layer that extends from the ground to an altitude of 2,400 to 3,000 feet above the airport's

[6] FAA Order 7400.2D, Procedures for Handling Airspace Matters, specifies that Class C airspace should accommodate at least (1) 75,000 annual instrument operations at the primary airport, (2) 250,000 passenger enplanements at the primary airport, or (3) 100,000 annual instrument operations at the primary airport and any secondary airports within the Class C airspace.

elevation. Air traffic controllers are not required to provide separation services to VFR flights within Class D airspace.

Class D airspace, indicated on Figure 3-4, is associated with three airports in the area: General William Fox Field, Edwards Air Force Base, and Mojave Airport.

Class E Airspace. Class E airspace is controlled airspace, but is the least stringent controlled airspace classification in terms of pilot certification, aircraft equipment, entry requirements, etc. No separation services are provided to VFR aircraft in the Class E airspace area.

Class E airspace, indicated on Figure 3-4, is associated with General William Fox Field.

Class E airspace that is 700 feet above ground level is indicated on Figure 3-4. Three airports within the vicinity of Tehachapi are associated with this form of Class E airspace (Mojave, Fox Field, and Bakersfield).

Military Operations Area (MOA)

These are airspace assignments of defined vertical and lateral dimensions established to separate certain military activities from IFR traffic and to identify for VFR traffic where these activities are conducted.

Tehachapi Municipal is located within the Isabella MOA. This MOA has a floor of 200 feet above ground level (AGL) and a ceiling of flight level 180 (18,000 feet above mean sea level). There is a three nautical mile radius circle centered on Tehachapi in which airspace up to 1,500 feet AGL is excluded from the Isabella MOA.

Bordering the western side of the Isabella MOA is the Bakersfield MOA. The Bakersfield MOA has a floor of 2,000 AGL and a ceiling of flight level 180.

Restricted Area

These areas are designated airspace within which the flight of aircraft is subject to restriction. Restricted areas are typically associated with military operations and denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery or guided missiles. The Restricted Area shown in Figure 3-4 is R-2515. This restricted area is for unlimited altitude and continuous use.

Special Military Activity

Special Military Activity airspace assignments are where IFR Military Training Routes and Military Operations Area within which the Department of Defense (DOD) conducts periodic operations

involving unmanned aerospace vehicles. The status of these routes and areas may be obtained by contracting the controlling FAA/DOD.[7]

South of Tehachapi are two Special Military Activity areas. Both have a floor of 500 feet AGL. The south most area has a ceiling of 9,000 feet MSL and the north most area has a ceiling of 10,000 feet MSL.

Federal Airways and VFR Flyways

Low Altitude Federal Airways (Victor Airways). Victor airways are airspace routes typically used by low-performance aircraft that fly at lower altitudes than commercial jets, including prop and turboprop commuter and general aviation aircraft. Victor airways are also frequently used to define the route structures used by higher performance aircraft flying below 18,000 feet MSL. Victor airways are defined in terms of the radial headings that extend outwards from VORs, and VORTACs. Low altitude federal airway segments in the vicinity of the airport include the following:

- V165 - 459 between the Lake Hughes VORTAC (near Lake Hughes) and the Tule VOR (south of Porterville). This airway is southwest of Tehachapi Municipal.

- V165 – 197 between the Palmdale VORTAC (at Palmdale International Airport) and the Shafter VORTAC (near Bakersfield). This airway is southwest of Tehachapi Municipal.

- V137 between the Gorman VORTAC (in the Tejon pass) and the Palmdale VORTAC. This airway is south of Tehachapi Municipal.

Victor airways are used primarily by pilots that have filed instrument flight rules (IFR) flight plans, including pilots of commercial aircraft. Pilots that have not filed such flight plans fly under visual flight rules (VFR). In Southern California, preferred VFR Flyways have been designated to keep these VFR flights from interacting with IFR traffic.

Military Training Routes. Figure 3-4 depicts the Military Training Routes (MTRs) within 25 nautical miles of Tehachapi Municipal. Several MTRs are near Tehachapi including: IR200, IR211, IR236, IR425, VR1206, VR1257, VR1262, and VR1265. These routes are located to the south and east of the airport.

Air Traffic Control

There is no air traffic control tower at Tehachapi Municipal.

[7] Los Angeles Sectional Aeronautical Chart, July 2002.

Local Operating Procedures

The local traffic pattern is at an altitude of 4,998 feet MSL. Due to the mountainous terrain north of the airport the local pattern is to the south (Figure 3-5). This provides a standard left pattern for Runway 29 and a non-standard right pattern for Runway 11. Mountain Valley Airport is approximately 3.5 miles to the south east. The north most runway (9L-27R) is used for gliders.

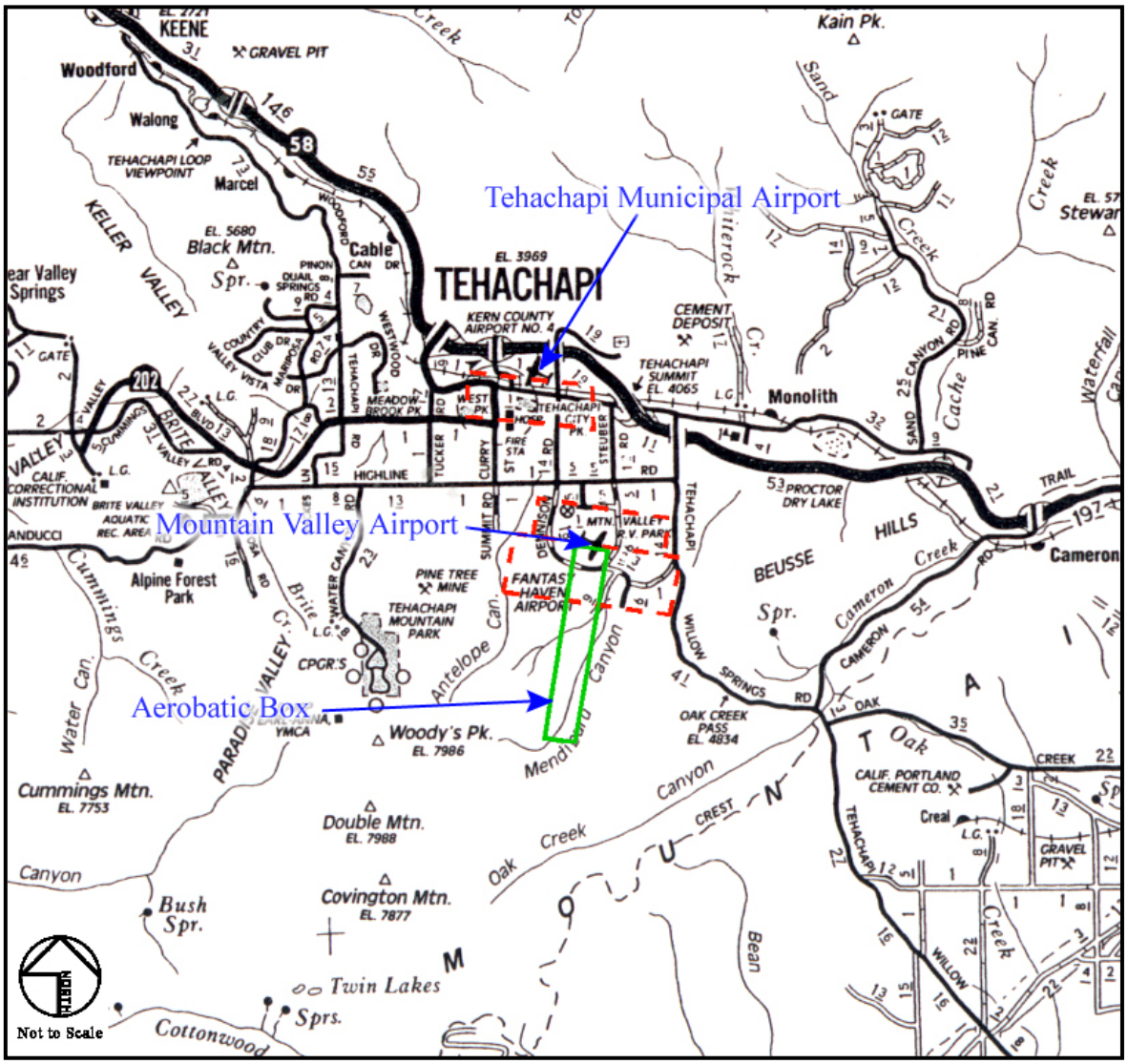

Figure 3-5
Local Traffic Patterns

There are roughly one and a quarter miles between Tehachapi's and Mountain Valley's traffic patterns, exceeding standards in FAA Order 7480.1A which specifies a half mile buffer zone.

Figure 3-5 also shows the aerobatic box located south of Mountain Valley Airport. The aerobatic box is in use between May and October. During this time period it is utilized approximately a dozen times a year. The box is 3 nautical miles long by a half nautical mile wide and extends to 5,000 feet MSL just south of Mountain Valley Airport.

There are no noise abatement procedures at Tehachapi Airport.

AIRPORT LANDSIDE FACILITIES

Landside facilities at Tehachapi Municipal Airport include the administration building, aircraft parking aprons, hangars, fuel facilities, auto parking, and airport support facilities. The landside facilities at the airport are located on the south side of the field.

Administration Building

The administration (terminal) building is located near midfield and is accessible from "J" Street. The administration building has a flight planning area, restroom, shower, kitchen and administrative offices. Although the administration building appears to be in relatively good condition, it would probably not meet today's seismic and Americans With Disabilities Act (ADA) standards.

Aircraft Parking Apron

The apron east of the administration building (Figure 3-3) has 30 tie-downs, ten of which are for based aircraft and the remaining 20 are for transient aircraft. Some transient tie-downs can be designated as based aircraft tie-downs if needed. An apron on the east end of the airport has 24 tie-downs for based aircraft.

Ten tie-downs are located on Benbow's leasehold. Seven tie-downs are for based aircraft and the remaining three are for transient aircraft. It is noted that room is available for more tie-downs on this leasehold.

The other Fixed Base Operator (FBO) on the airport, Mountain Hawk Aviation, has no marked tie-downs on their leasehold. Mountain Hawk has two planes that are parked in front of the hangar on their leasehold.

Aircraft Storage Hangars

There are 57 hangars at Tehachapi Municipal Airport. Mountain Hawk Aviation has one hangar and Benbow has three hangars. The City owns and rents out four hangars. The remaining 49 hangars are individually owned hangars on city leased properties.

Fuel Storage and Distribution

All aviation fuel at the airport is sold by the City of Tehachapi. There are two 6,000 gallon above ground tanks containing 100 octane low lead (100LL) on the airport. The storage capacity is sufficient to meet existing demands.

Vehicle Parking

There are eleven paved vehicle parking spaces adjacent to the administration building. Mountain Hawk Aviation has ten paved parking spaces. There is room for roughly 13 vehicles in a grass area near the administration building. There are 15 parking spaces on Benbow's leasehold. There is additional space at Benbow for vehicle parking if needed.

Airport Support Facilities

A park is located on the airport. The park is located south of the eastern tie-down ramp (Figure 3-3) and is not accessible to the general public. Restrooms will be provided at the park within the next year. The park is maintained by the City.

UTILITIES AND PUBLIC SERVICES

Utilities

Utility services at the airport are provided by the following companies:

- Electric: Southern California Edison Company
- Gas: Southern California Gas Company
- Water: City of Tehachapi
- Phone: SBC

Wastewater Disposal Fields

North of the runway are wastewater disposal fields (Figure 3-3). These fields provide for the disposal of treated water from the City of Tehachapi Wastewater Treatment Plant. The fields nearest to the Dennison Road overpass of State Route 58 and in the northwest area of the airport have recently been in agricultural production as alfalfa fields.

Fire Protection

Fire protection, including building fire-fighting and aircraft rescue and fire-fighting (ARFF) is primarily the responsibility of the Kern County Fire Department. The nearest fire station is located on the corner of Curry and Valley, about 1 mile from the airport. Response times to the airport are in the three minute range.

Security Facilities and Services

The Kern County Sheriff is responsible for police protection at the airport.

The airport is secured by a 6-foot high chain-link fence with barbed wire on top. There are three vehicle access gates around the airport (at the end of Green Street, onto Benbow's leasehold from Commercial Way, and "J" Street to the administration building). All except one (Benbow) have card readers. The gate located at Benbow is left open during the day and monitored by the FBO.

AIRPORT MANAGEMENT, TENANTS AND AVIATION SERVICES

Airport administration is provided by the City of Tehachapi, under the direction of George Walker, Airport Manager. Airport maintenance is performed by an airport attendant with equipment and support from the City's Department of Public Works.

The principal airport tenants are Benbow and Mountain Hawk Aviation. Benbow is located west of midfield on the south side of the runway and Mountain Hawk Aviation is approximately midfield also on the south side of the runway.

General aviation services are provided by both Benbow and Mountain Hawk Aviation. Table 3-2 illustrates who provides services at Tehachapi Municipal.

AIRPORT ACTIVITY

Based Aircraft

A based aircraft is one that is permanently stationed at an airport. In July 2002, there were approximately 67 aircraft based at the airport (Table 3-3). The aircraft mix was 94 percent single engine piston and 6 percent multi-engine piston. Data for 2002 was taken from current airport records and surveys of airport tenants. The history of aircraft based at Tehachapi Municipal Airport from 1980, taken from FAA records, is shown in Table 3-4. Records from 1980 indicate a high of 90 based aircraft in 1992 and 1993.

Table 3-2
General Aviation Services at Tehachapi Municipal Airport [a]

Service	City of Tehachapi	Kern County	Benbow	Mountain Hawk Aviation
Airport administration	X			
Airport maintenance	X			
Airport security		X		
Fire protection		X		
Aircraft parking/storage				
Large shared hangar space				
Individual hangar rental	X		X	
Tie-downs	X		X	
Transient/guest parking	X		X	
Aircraft maintenance				
Engine			X	X
Airframe			X	X
Avionics/radio				X
Sales				
New/used aircraft				
Parts			X	X
Pilot supplies			X	X
Flight instruction			X	X
FAA testing facility				
Aircraft rental			X	X
Aircraft charter				
Fuel sales				
100 LL	X			
Other services				
Unicom operation	X			
Flight Planning Area	X		X	X
Car rental			X	X

[a] Source: Survey by DMJM Aviation.

Table 3-3
Based Aircraft at
Tehachapi Municipal Airport, July 2002 [a]

Location of Aircraft [b]	Number of Based Aircraft by Type [a]		
	Single Engine Piston	Multi-Engine Piston	Total
In Individual hangars			
City of Tehachapi	3	0	3
City of Tehachapi Leased	45	4	49
Benbow	2	0	2
Mountain Hawk Aviation	0	0	0
Subtotal individual hangars	50	4	54
On Tie-downs			
City of Tehachapi	4	0	4
Benbow	7	0	7
Mountain Hawk Aviation[b]	2	0	2
Subtotal tie-downs	13	0	13
Total based aircraft	63	4	67
Percent by Type	94.0%	6.0%	100%

[a] Sources: City of Tehachapi and FBO survey by DMJM Aviation.
[b] Mountain Hawk has no marked tie-downs

Aircraft Operations

An aircraft operation, or movement, is defined as either a takeoff or landing, with a touch-and-go counting as two operations. General aviation is all flying that is not for commercial passenger service or military. General aviation operations are 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 (including touch-and-go operations), (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. The itinerant operations include operations by transient aircraft, aircraft not based at the airport.

Annual Aircraft Operations. Aircraft operations were an estimated 11,000 in 2001 (Table 3-5). Approximately 41 percent were estimated to be local operations. Table 3-5 also identifies that estimated operations have declined at the Airport since 1980.

Table 3-4
History of Based Aircraft at
Tehachapi Municipal Airport

Year	Number of Based Aircraft by Type [a]			
	Single Engine Piston	Multi-Engine Piston	Other	Total
1980	41	2	0	43
1981	41	2	0	43
1982	41	2	0	43
1983	57	5	0	62
1984	59	3	0	62
1985	58	3	0	61
1986	62	2	0	64
1987	62	2	0	64
1988	62	2	0	64
1989	57	5	0	62
1990	58	7	0	65
1991	58	7	0	65
1992	85	5	0	90
1993	85	5	0	90
1994	[b]	[b]	[b]	[b]
1995	70	4	0	74
1996	70	4	0	74
1997	70	4	1	75
1998	70	4	1	75
1999	70	4	1	75
2000	70	4	1	75
2001	70	4	1	75
2002	63	4	0	67

[a] Sources: 1980-2001: Estimates contained in FAA 2002 Terminal Area Forecast; 2002: City of Tehachapi and FBO survey by DMJM Aviation.
[b] Data not available.

Peak Month, Daily and Peak Hour Operations. The peak month for operations at Tehachapi Municipal is typically July or August. In 2001, August was the peak month with 1,345 operations, 12.2 percent of annual operations and an average of 43 a day during the peak month. There are no records of hourly operations at the airport. A reasonable estimate of peak hour operations in the average day of the peak month based on experience at similar airports is 12.5 percent of the total. Using this rule-of-thumb, there were an estimated 5 operations in the peak hour of the average day of the peak month in 2001.

Table 3-5
History of Aircraft Operations at
Tehachapi Municipal Airport [a]

Year	Itinerant Operations			Local Operations		Total Opera-tions
	Air Carrier & Air Taxi	General Aviation	Military	General Aviation	Military	
1980	1,500	13,000	0	13,000	0	27,500
1981	1,500	13,000	0	13,000	0	27,500
1982	4	13,000	0	13,000	0	26,004
1983	1,500	12,000	0	12,000	0	25,500
1984	1,500	12,000	0	12,000	0	25,500
1985	0	12,000	0	12,000	0	24,000
1986	0	12,000	0	12,000	0	24,000
1987	0	13,500	0	12,000	0	25,500
1988	0	13,600	0	12,181	0	25,781
1989	0	13,500	0	12,000	0	25,500
1990	4	7,000	0	6,000	0	13,004
1991	4	7,000	0	6,000	0	13,004
1992	2	5,730	0	4,000	0	9,732
1993	0	5,730	0	4,000	0	9,730
1994	[b]	[b]	[b]	[b]	[b]	[b]
1995	0	6,500	0	4,500	0	11,000
1996	0	6,500	0	4,500	0	11,000
1997	0	6,500	0	4,500	0	11,000
1998	0	6,500	0	4,500	0	11,000
1999	0	6,500	0	4,500	0	11,000
2000	0	6,500	0	4,500	0	11,000
2001	6	6,500	0	4,500	0	11,000

[a] Source: Estimates contained in FAA 2002 Terminal Area Forecast.
[b] Data not available.

During the busiest days, the daily and peak hour operations are greater than those for the average day of the peak month. However, estimates for the average day of the peak month and peak hour of the average day of the peak month are appropriate for facility planning purposes.

Aviation Fuel Consumption

In 2000, approximately 36,400 gallons of aviation gas (avgas) were pumped at the airport. In 2001, approximately 37,700 gallons of aviation gas (avgas) were pumped at the airport. Aviation gas is delivered to the airport by tanker truck.

AIRCRAFT OWNERS SURVEY

A survey of based aircraft owners was conducted to obtain information on their use of the airport and solicit comments and suggestions regarding the Airport Master Plan. The survey questionnaire is in Appendix B. Questionnaires were sent to all tie-down and hangar customers in September, 2002. Twenty-nine completed questionnaires were received and tabulated. These questionnaires represented about 43 percent of the airport's based aircraft in 2002. Characteristics of owners of aircraft based at the airport are shown in Table 3-6.

Table 3-6
Profile of Owners of Aircraft
Based at Tehachapi Municipal Airport, 2002 [a]

Characteristic	Survey Response
Reasons for basing aircraft at airport (percent of respondents)	
Proximity to home	93%
Availability of facilities	34%
Favorable flying conditions	24%
Proximity to business	17%
Availability of services	17%
Cost of services	14%
Ability to build own hangar	10%
Use of aircraft (average of responses)	
Personal	76%
Business	17%
Training	7%
Average dollars spent annually in Tehachapi area for operation of aircraft based at the airport (based on average of responses)	$3,300

[a] Source: Airport survey, September 2002.

SECTION 4
AVIATION FORECASTS

SECTION 4
AVIATION FORECASTS

INTRODUCTION

This section presents the forecasts of aviation activity for Tehachapi Municipal Airport. These projections represent the future traffic levels to be accommodated at the airport. The forecasts developed for this study cover the period between 2002 and 2025. Intermediate year forecasts are provided for 2010 and 2015. The forecasts serve as the basis for determining the phased development of facility improvements for the short, intermediate and long-range planning periods.

The forecast analysis includes projections of:

- Total based general aviation aircraft by type (single engine piston and multi-engine piston)
- Total annual aircraft operations by type of operation (local versus itinerant operations)
- Aircraft operations in the peak hour
- Annual aviation fuel flowage

Due to uncertainties in the aviation industry, long-term forecasting of airport activity can only be approximate in nature. However, the forecasts described here were developed using the best available information and will serve the useful function of providing guidance on future airport facility needs.

TEHACHAPI MUNICIPAL AIRPORT SERVICE AREA

Location of Airport Service Area

This area, shown in Figure 4-1, is identified as the primary Airport Service Area (ASA). There is one other public-use airport in the ASA, Mountain Valley Airport with about 80 based aircraft, mostly gliders.

Socioeconomic Base of the Airport Service Area

The ASA encompasses the same area as Kern Council of Governments' Planning Area 6 (Tehachapi Planning Area). This area is comprised of census tracts 60, 61 and a portion of 51.01.

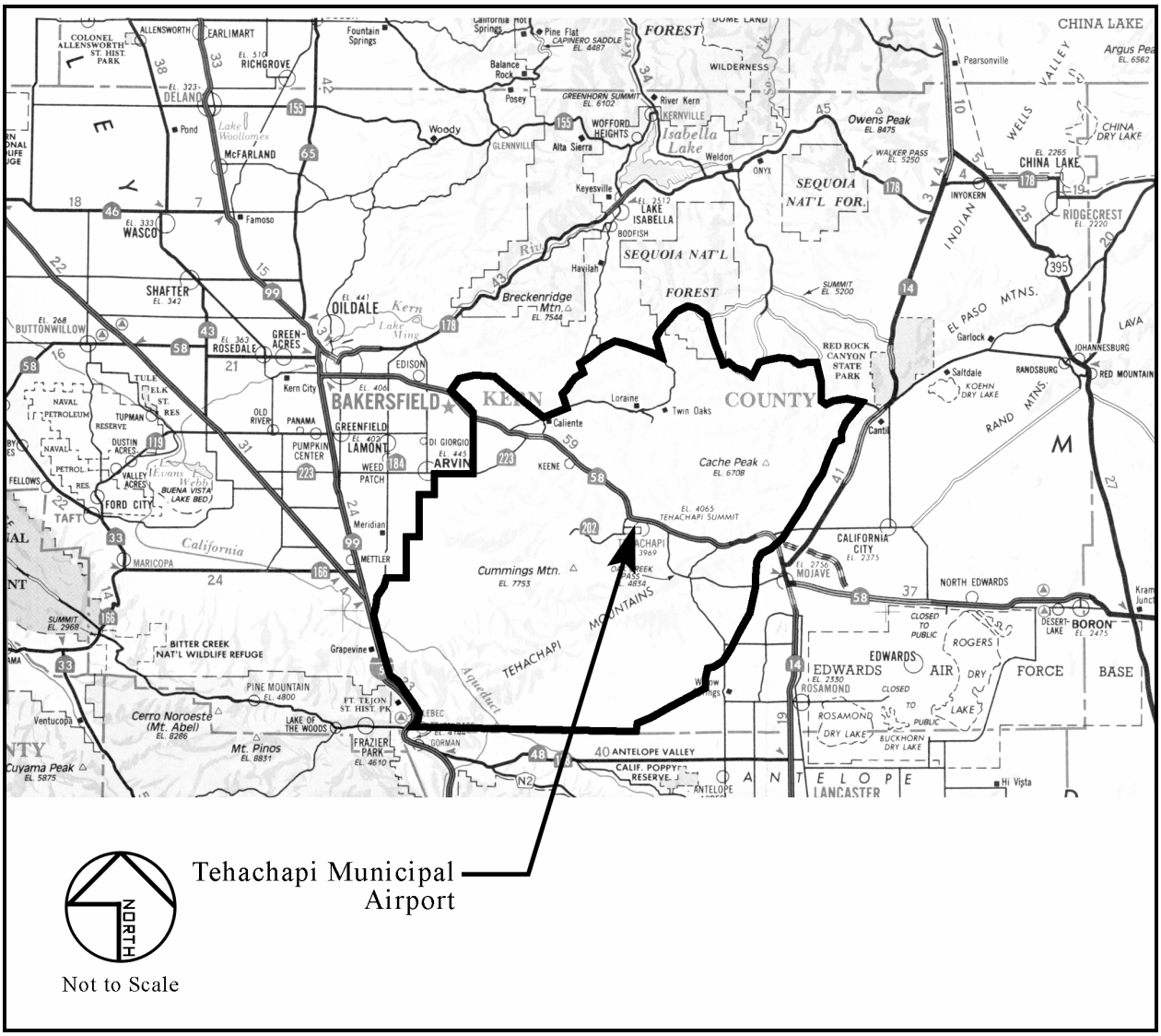

Figure 4-1
Primary Airport Service Area

The area includes the incorporated city of Tehachapi as well as the unincorporated communities of Golden Hills, Stallion Springs, Bear Valley Springs, and Old Town.

Economy. The economy of the ASA is diverse and growing. Industries include resource extraction, wind power generation, building materials production, aerospace/defense, and agriculture. The

California Correctional Institution at Tehachapi is located within the ASA. Between 1990 and 2000, employment in the area rose by 70 percent. In a report prepared for the City of Tehachapi by Burnes Consulting, the area is characterized as a young, stable community with growing population and income. Median household income in the area is expected to increase from $45,000 in 2000 to $57,000 in 2005, an increase of 21 percent. Per capita income growth in the ASA over the same period is projected to outpace that of the nation.[1]

Population Growth. Population in the ASA grew from 25,902 in 1990 to 34,532 in 2000, an average annual increase of 2.9 percent, which exceeded the population growth rate of Kern County, the state, and the nation (Table 4-1).

Table 4-1
Population Growth in the Tehachapi Municipal Airport Service Area, Kern County, California, and the United States, 1990 to 2000 [a]

Area	1990 Population	2000 Population	Annual Growth Rate
Tehachapi ASA [a]	25,902	34,532	2.92%
Kern County [b]	560,400	688,033	2.07%
California [b]	30,296,000	34,884,661	1.42%
United States [b]	248,710,000	273,575,201	0.96%

[a] Source: Kern Council of Governments, 2000 Regional Housing Allocation Plan, May 17, 2000.

[b] Source: Central California Futures Institute, Forecasts for the Central Valley to 2010 and beyond.

FORECAST OF BASED AIRCRAFT

The likely range of aircraft based at the airport was projected on the basis of the range of expected growth in ASA population and other considerations. From this range of potential growth in based aircraft, the medium growth projection was selected for the Master Plan forecast.

[1] Burnes Consulting, July 2000.

Forecast Range

The High and Medium Growth forecasts were developed by estimating a future rate of based aircraft per thousand of population, then applying various population growth rates for the ASA. The number of based aircraft per thousand persons in both cases was estimated to decline slightly from the 2002 rate in proportion to the decline projected for piston aircraft per thousand persons in the U.S. by the FAA (Table 4-2). Based aircraft per thousand of ASA population are projected to decline from 1.83 in 2002 to 1.73 in 2025.

In the High Growth forecast, ASA population is projected to grow at an average annual rate of 3.0 percent, which is slightly higher than the growth experienced in the ASA from 1990 to 2000. The Kern Council of Governments has stated that the long-range forecasts it is developing now for Kern County will be based on a growth rate of about 3 percent.

In the Medium Growth forecast, ASA population is projected to grow at an average annual rate of 2.5 percent from 2002 to 2010, 2.4 percent from 2010 to 2015, and 2.3 percent from 2015 to 2025. This is approximately the rate of growth in Kern County population recently projected by the State of California.

The Low Growth forecast was developed by extrapolating the historical based aircraft trend line from the 2002 number of based aircraft.

Forecast of Aircraft Based at the Airport

The Master Plan forecast uses the Medium Growth projection, an increase in based aircraft from 67 in 2002 to 80 in 2010, 89 in 2015, and 109 in 2025 (Figure 4-2 and Table 4-3). In 2025 the mix of aircraft is expected to remain relatively unchanged from today – 94 percent single engine piston and 6 percent multi-engine piston aircraft.

FORECAST OF ANNUAL AIRCRAFT OPERATIONS

Total Operations

Total annual operations were projected on the basis that the number of operation per based aircraft experienced recently will remain the same. In 2001/2002, the airport averaged 164 operations per based aircraft. A ratio of 164 operations per based aircraft is projected to continue through 2025. The resulting aircraft operations forecast is 13,100 in 2010, 14,600 in 2015, and 17,900 in 2025, compared with 11,000 operations in 2001 (Table 4-3).

Table 4-2
Range of Forecasts of Aircraft Based at
Tehachapi Municipal Airport, 2002 to 2025 [a]

Item	Year			
	2002	2010	2015	2025
U.S. General Aviation Piston Aircraft per 1,000 Population Projected by the FAA [i]				
U.S. Active Piston Aircraft (000) [b]	175.3	184.0	189.3	199.5
U.S. Population (000,000) [c]	280.3	299.9	312.3	337.8
Piston Aircraft per 1,000 Population	0.63	0.61	0.61	0.59
Based Aircraft Forecast Range for Tehachapi Municipal Airport				
High Growth Forecast				
Tehachapi Area Population (000) [d]	36.6	46.4	53.7	72.2
Annual Population Growth Rate [e]	--	3.0%	3.0%	3.0%
Based Aircraft per 1,000 Population [f]	1.83	1.80	1.77	1.73
Based Aircraft	67	83	95	125
Medium Growth Forecast				
Tehachapi Area Population (000) [d]	36.6	44.6	50.2	63.0
Annual Population Growth Rate [g]	--	2.5%	2.4%	2.3%
Based Aircraft per 1,000 Population	1.83	1.80	1.77	1.73
Based Aircraft	67	80	89	109
Low Growth Forecast				
Based Aircraft [h]	67	75	80	90

[a] Source: DMJM Aviation analysis.

[b] Source: Federal Aviation Administration, FAA Long-Range Forecasts, Fiscal Years 2015, 2020 and 2025, June 2001.

[c] Source: U.S. Census Bureau, "Annual Projections of Total Resident Population as of July 1," February 14, 2000.

[d] Population is for Kern Council of Governments Planning Area 6.

[e] The approximate population growth rate estimated for Kern County by the Kern Council of Governments is 3 percent.

[f] Based aircraft per 1,000 population in the future is projected to decline in proportion to the projected decline in U.S. general aviation piston aircraft per 1,000 population.

[g] Estimated to be equal to the population growth rates projected for Kern County in Interim County Population Projections, State of California, June 2001.

[h] Based on the historical trend of based aircraft growth at Tehachapi Municipal.

[i] For comparison, the number of based aircraft per 1,000 persons was 1.07 in California and 1.66 in Kern County, based on 2000 and 2001 data.

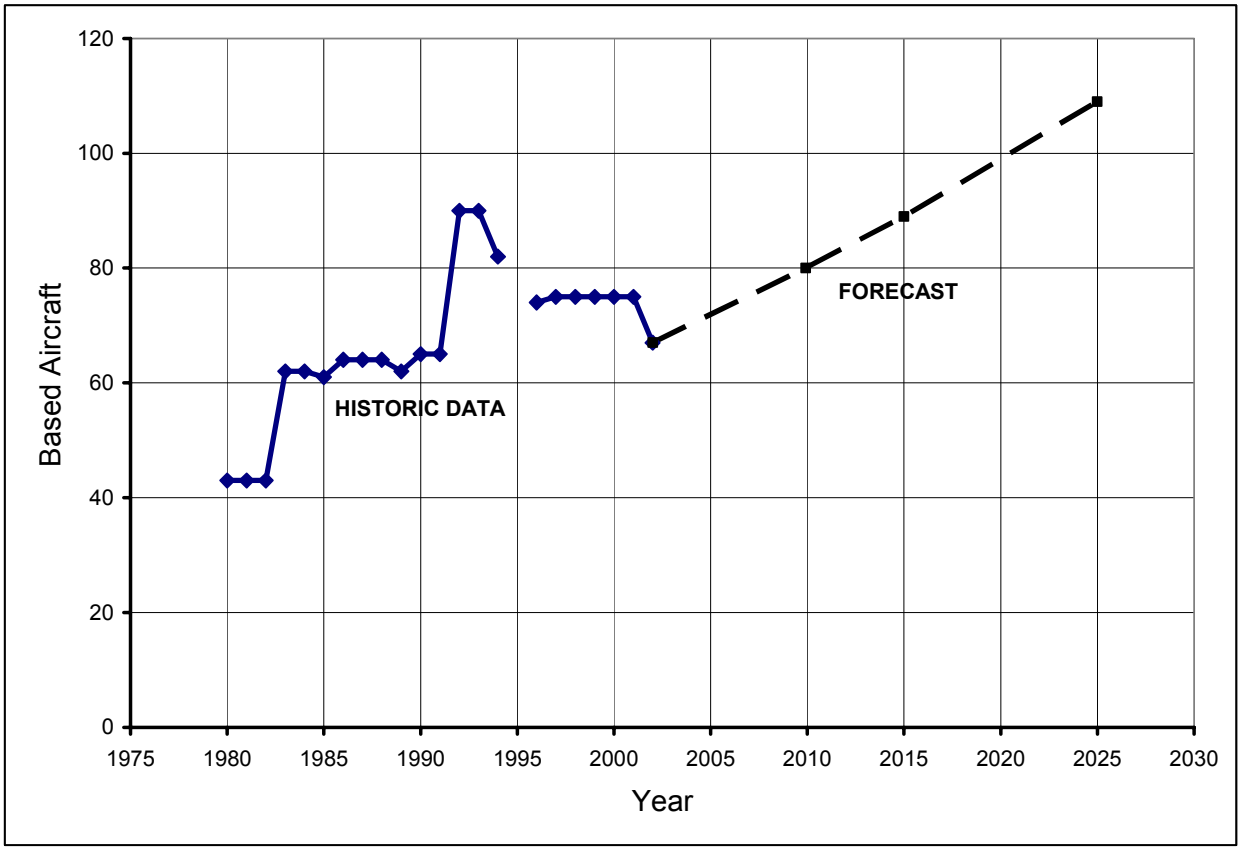

Figure 4-2
Based Aircraft Forecast

Local and Itinerant Operations

In 2001, about 41 percent of general aviation operations were local operations. Local operations are expected to average 41 percent through 2025 (Table 4-3).

FORECAST OF PEAK HOUR OPERATIONS

Peak hour operations in the average day of the peak month (ADPM) were projected. Peak hour operations will be compared with runway capacity to identify potential airfield capacity deficiencies.

Table 4-3
Based Aircraft and Operations Forecasts
For Tehachapi Municipal Airport, 2001/2002 to 2025

Item	Actual 2001/ 2002 [a]	Forecast [b]		
		2010	2015	2025
Based Aircraft				
Single Engine Piston	63	75	83	102
Multi Engine Piston	4	5	6	7
Total Based Aircraft	67	80	89	109
Aircraft Operations				
Operations per Based Aircraft	164	164	164	164
Percent Local Operations	41%	41%	41%	41%
Local Operations	4,500	5,400	6,000	7,300
Itinerant Operations	6,500	7,700	8,600	10,600
Total Operations	11,000	13,100	14,600	17,900

[a] Sources: Survey by DMJM Aviation and airport records. Actual based aircraft are for 2002; actual operations are estimated for 2001.
[b] Source: DMJM Aviation analysis.

In 2001, peak month (August) operations were estimated to be 12.2 percent of the annual total, based on fuel sales. This relationship is projected to continue to 2025. Busy day operations are defined by the FAA as those operations in an average day in the peak month, or peak month operations divided by 31. It is estimated that 12.5 percent of the busy day operations occur in the peak hour. Based on these relationships, peak hour operations are expected to increase from 5 in 2001 to 6 in 2010, 7 in 2015 and 9 in 2025 (Table 4-4). Although there are hourly periods with more operations, the number of operations in the peak hour of the average day of the peak month is a useful guide for planning future airport facilities.

Table 4-4
Peak Hour Aircraft Operations Forecast for
Tehachapi Municipal Airport, 2001 to 2025

Item	Actual 2001 [a]	Forecast [b] 2010	2015	2025
Annual Operations	11,000	13,100	14,600	17,900
Percent of Operations in Peak Month	12.2%	12.2%	12.2%	12.2%
Operations in Peak Month	1,300	1,600	1,800	2,200
Operations in Busy Day [c]	42	52	58	71
Percent of Busy Day Operations in Peak Hour	12.5%	12.5%	12.5%	12.5%
Operations in Peak Hour of ADPM	5	6	7	9

[a] Source: Airport records and DMJM Aviation analysis.

[b] Source: DMJM Aviation analysis.

[c] Busy day operations are estimated as the number of peak month (August) operations divided by 31.

AVIATION GAS (AVGAS) FORECAST

Avgas flowage is projected using historic ratios of fuel flowage to annual operations. In 2001, an average of approximately 3.4 gallons of 100LL gasoline was pumped at the airport per aircraft operation. This average is assumed to continue into the future and is applied to the total number of forecast aircraft operations to arrive at the projected avgas flowage. Avgas pumped at the airport is estimated to increase from an average of 37,700 gallons in 2001 to 44,500 gallons in 2010, 49,600 gallons in 2015, and 60,100 gallons in 2025 (Table 4-5).

Table 4-5
Aviation Fuel Flowage Forecast
Tehachapi Municipal Airport, 2001/2002 to 2025

Item	Average 2000 - 2001 [a]	Forecast [b] 2010	2015	2025
Annual Operations	11,000	13,100	14,600	17,900
Aviation Gas				
Gallons per Operation	3.4	3.4	3.4	3.4
Total Gallons Pumped	37,700	44,500	49,600	60,100

[a] Source: City of Tehachapi.
[b] Source: DMJM Aviation analysis.

COMPARISON WITH PREVIOUS FORECASTS

Kern Regional Aviation System Plan Forecast

The Kern Regional Aviation System Plan (Kern RASP) prepared by the Kern Council of Governments (Kern COG) in 1998 contains a based aircraft forecast for Tehachapi Municipal.

That forecast indicates that general aviation aircraft based at Tehachapi will increase to 123 by 2020. The based aircraft Master Plan Update forecast for 2025 is about 11 percent less than the Kern COG forecast for 2020.

Central California Aviation System Plan Forecast

The State of California in its 1999 Central California Aviation System Plan (CCASP), Forecast Element, projects that Tehachapi Municipal will base 129 aircraft and have 19,176 operations in 2020. The Master Plan Update forecasts for 2025 are 16 percent and 17 percent lower than the 2020 CCASP forecasts for based aircraft and operations, respectively.

FAA Terminal Area Forecast (TAF)

The most recent FAA Terminal Area Forecast (TAF) was released in March 2003. The TAF forecast projects 75 based aircraft at Tehachapi to 2020. The Master Plan Update forecast for 2025 is about 45 percent greater than this. The TAF forecast projects 11,000 annual operations in 2020. The Master Plan Update forecast for 2025 is about 63 percent greater than this.

Table 4-6
Comparison of Based Aircraft and Operations Forecasts for Tehachapi Municipal Airport, 2001/2002 to 2025

Item	Actual 2001/02	Forecast [b]			Master Plan Forecast Percent Above (Below) Other Forecast		
	[a]	2010	2015	2020/25	2010	2015	2020/25
2002 Master Plan Update							
Based Aircraft	67	80	89	109	--	--	--
Operations	11,000	13,100	14,600	17,900	--	--	--
1998 Kern RASP [c]							
Based Aircraft		111	116	123	(28%)	(23%)	(11%)
1998 CCASP [d]							
Based Aircraft		104	115	129	(23%)	(23%)	(16%)
Operations		15,459	17,094	19,176	(15%)	(15%)	(17%)
2001 FAA TAF [e]							
Based Aircraft		75	75	75	7%	19%	45%
Operations		11,000	11,000	11,000	19%	33%	63%

[a] Source: DMJM Aviation survey and airport records. Based aircraft data are for 2002 and operations data are for 2001.
[b] The Master Plan forecasts in the "2020/25" column are for 2025; others are for 2020.
[c] Kern Council of Governments, Kern Regional Aviation System Plan, February 1998.
[d] Source: State of California, Department of Transportation, Division of Aeronautics, Central California Aviation System Plan, Forecast Element, March 1999.
[e] Source: Federal Aviation Administration, 2002 Terminal Area Forecast, released March 2003.

SECTION 5
FACILITY REQUIREMENTS

SECTION 5
FACILITY REQUIREMENTS

The process of determining facility requirements involves the application of airport planning standards to the projected airport activity to identify the facilities needed to handle the expected traffic. By comparing the future facility needs with existing facility sizes and capacities, facility deficiencies (and needed improvements) are determined.

AIRPORT CLASSIFICATION AND FAA PLANNING STANDARDS

The FAA in its Advisory Circular AC 150/5300-13, Airport Design, has developed an Airport Reference Code (ARC) system that relates airport design criteria and planning standards to two components: (1) the operational characteristics and (2) the physical characteristics of aircraft operating at or expected to operate at the airport.

The first element of the code, the aircraft approach speed category, relates to operational characteristics. The aircraft approach category is a grouping of aircraft that is based on 1.3 times the stalling speed (Table 5-1).

Table 5-1
Aircraft Approach Categories

Category	Approach 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

Source: FAA, Airport Design, AC 150/5300-13.

The second component of the ARC is the airplane design group and relates to the wingspan of aircraft and therefore is a physical characteristic (Table 5-2). Airplane Design Group I has a further

subdivision for those airports serving small airplanes (12,500 pounds or less maximum takeoff weight) exclusively.

Table 5-2
Airplane Design Groups

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

Source: FAA, Airport Design, AC 150/5300-13.

The aircraft approach speed element of the ARC generally deals with runways and runway related facilities whereas the wingspan (and relevant airplane design group) relates to separations required between airfield elements, such as runway-taxiway separations and taxilane-apron clearances.

The airport primarily serves aircraft in the ARC B-I category for small airplanes only. This category includes primarily single-engine airplanes (such as the Beech Bonanza and Cessna 172) and twin-engine piston airplanes (such as the Beech Baron and Cessna 402). Although there are occasional transient aircraft at the airport exceeding this classification, the numbers of operations by those aircraft have been and are expected to be relatively small.

Table 5-3 compares the existing airfield dimensions with the airport planning and design standards, taken from FAA Advisory Circular AC 150/5300-13, Airport Design, for an Airport Reference Code of B-I, for small airplanes.[1] Presently, the airport meets the FAA standards with the following exceptions:

- The distance between the runway centerline and parallel taxiway centerline is less than standard.
- The runway width of 50 feet is below the standard of 60 feet. The runway is being widened to 75 under a current improvement project.

[1] Throughout the remainder of this report, ARC B-I will refer to the ARC B-I standards for small airplanes, unless noted otherwise.

Table 5-3
Airport Planning and Design Standards
For Airport Reference Code B-I

Item	Existing Dimension (Feet)	ARC B-I Require-ment for Small Airplanes (Feet) [a]	Deviation from Standard
AIRPORT CATEGORY AND AIRPORT DATA			
Aircraft Approach Category		B	
Airplane Design Group (ADG)		I [a]	
Maximum airplane wingspan for ADG I		48.99	
Airport elevation (MSL)	3998		
SEPARATION STANDARDS			
Runway centerline to parallel runway centerline	NA	700	
Runway centerline to parallel taxiway/taxilane centerline	110	150	Runway/taxiway separation
Runway centerline to edge of aircraft parking	260 [b]	125	
Taxiway centerline to parallel taxiway/taxilane centerline	115	69	
Taxiway centerline to fixed or movable object	100 [b]	44.5	
Taxilane centerline to parallel taxilane centerline	NA	64	
Taxilane centerline to fixed or movable object	39.5 [b]	39.5	
RUNWAY DESIGN STANDARDS			
Runway width	50	60	Runway width [d]
Runway shoulder width	[c]	10	
Runway blast pad width	50	80	Blast pad width
Runway blast pad length	60	60	
Runway safety area width	120	120	
Runway safety area length beyond each runway end or stopway end, whichever is greater	0	240	Does not extend beyond stopway
Runway object free area width	250	250	
Runway object free area length beyond each runway end or stopway end, whichever is greater	0	240	Does not extend beyond stopway
Clearway width	NA	500	
Stopway width	50	60	Stopway width
TAXIWAY DESIGN STANDARDS			
Taxiway width	30-75	25	
Taxiway edge safety margin	[c]	5	
Taxiway shoulder width	[c]	10	
Taxiway safety area width	[c]	49	
Taxiway object free area width	[c]	89	
Taxilane object free area width	[c]	79	
Taxiway wingtip clearance	[c]	20	
Taxilane wingtip clearance	[c]	15	

Table 5-3
Airport Planning and Design Standards
For Airport Reference Code B-I
(Continued)

Item	Existing Dimension (Feet)	ARC B-I Require-ment for Small Airplanes (Feet) [a]	Deviation from Standard
RUNWAY PROTECTION ZONES [e]			
Runway Protection Zone for Runway 11:			
Length	1,000	1,000	
Width 200 feet from runway end	500	250	
Width 1,200 feet from runway end	700	450	
Runway Protection Zone for Runway 29:			
Length	1,000	1,000	
Width 200 feet from runway end	500	250	
Width 1,200 feet from runway end	700	450	
OBSTACLE FREE ZONES			
Runway obstacle free zone (OFZ) width	250	250	
Runway OFZ length beyond each runway end	200	200	
THRESHOLD SITING SURFACES [f]			
Threshold siting surface for Runway 11:			
Distance out from threshold to start of surface	[c]	0	
Width of surface at start of trapezoidal section	[c]	250	
Width of surface at end of trapezoidal section	[c]	700	
Length of trapezoidal section	[c]	2,250	
Length of rectangular section	[c]	2,750	Terrain penetration at
Slope of surface	[c]	20:1	approach end
Threshold siting surface for Runway 29:			
Distance out from threshold to start of surface	[c]	0	
Width of surface at start of trapezoidal section	[c]	250	
Width of surface at end of trapezoidal section	[c]	700	
Length of trapezoidal section	[c]	2,250	
Length of rectangular section	[c]	2,750	
Slope of surface	[c]	20:1	
FAR PART 77 SURFACES [g]			
Primary Surface width	[c]	500	[h]
Radius of Horizontal Surface	[c]	5,000	[h]
Approach Surface for Runway 11:			
Approach Surface length	[c]	5,000	[h]
Approach Surface width at end	[c]	1,250	[h]
Approach Surface slope	[c]	20:1	[h]

Table 5-3
Airport Planning and Design Standards
For Airport Reference Code B-I
(Continued)

Approach Surface for Runway 29:			
Approach Surface length	[c]	5,000	[h]
Approach Surface width at end	[c]	2,000	[h]
Approach Surface slope	[c]	20:1	[h]

[a] For small airplanes only (up to 12,500 pounds maximum certificated takeoff weight) and visual runways or runways with approach visibility minimums not lower than ¾ statute mile.
[b] Estimated.
[c] Not shown on existing Airport Layout Plans.
[d] Runway is being widened to 75 feet.
[e] Requirements are based on visual runways and runways with an instrument approach procedure with visibility minimum not lower than 1 mile.
[f] Requirements are based on existing conditions (visual runways). For runways with a non-precision straight-in instrument approach procedure, the surface would slope at 20:1 but would start at the threshold and would be larger.
[g] Requirements are based on a visual approach to Runway 11 and a non-precision straight-in approach to Runway 29 to protect for the potential for a future instrument approach procedure.
[h] FAR Part 77 surfaces are not airport design standards. However, they provide an identification of potential obstacles to air navigation.
NA = Not applicable.
Sources: FAA Advisory Circular AC 150/5300-13, Airport Design; Federal Aviation Regulations Part 77, Objects Affecting Navigable Airspace.

- Runways 11 and 29 have paved stopways that serve as blast pads. The effective blast pad is 50 feet wide, compared with the 80-foot standard. However, blast pads are required only if blast or propeller-wash erosion is a problem. The existing stopways adequately protect against blast and propeller-wash erosion.

- The Runway Safety Area and Runway Object Free Area do not extend beyond the ends of the stopways.

- The stopways are 50 feet wide rather than the standard of 60 feet.

- Terrain penetrates the approach end of the Runway 11 Threshold Siting Surface by about 46 feet.

AIRFIELD CAPACITY REQUIREMENTS

Hourly runway capacities and annual service volume (ASV) estimates are needed to compare projected operations activity with airfield capacity and identify the potential need for airfield improvements. The method for computing airport capacity is described in FAA Advisory Circular AC 150/5060-5, Airport Capacity and Delay. The ASV is a reasonable estimate of an airport's

annual capacity for aircraft operations. It accounts for differences in such factors as runway use, aircraft mix, and weather conditions that would be encountered over a year's time.

Runway Capacity

The hourly capacity estimates were derived in accordance with instructions and capacity curves set forth in FAA AC 150/5060-5 and applying FAA Airport Design (Version 4.2) software. Based on this methodology, the visual flight rules (VFR) hourly capacity of the runway is approximately 98 operations (each touch-and-go is two operations). VFR conditions occur whenever the cloud ceiling is at least 1,000 feet above ground level and visibility is at least three statute miles. The instrument flight rules (IFR) hourly capacity would be approximately 59 operations if an instrument approach procedure were available.

The ASV is calculated to be approximately 230,000 operations a year based on FAA AC 150/5060-5 and application of FAA Airport Design (Version 4.2) software.

Aircraft operations at the airport reached a peak of about 27,500 in 1980, about 12 percent of the ASV. Current levels of operations are approximately 5 percent of the ASV. There are no significant delays at Tehachapi Municipal Airport at the present nor are significant delays projected within the long range planning period.

Demand Versus Capacity

By comparing ASV and hourly capacities with the forecast annual and peak hour demand, the potential need for airfield improvements is determined.

As seen in Table 5-4, the present airfield will easily accommodate the projected demand through the planning period. Generally, planning for capacity improvements should be initiated when demand is forecast to utilize 60 percent of capacity (FAA Order 5090.3B). This allows sufficient lead-time to develop the improvement before the airport experiences intolerable delays.

From this comparison of demand and capacity it is concluded that airfield (runway/taxiway) improvements are not needed for the purpose of increasing airfield capacity.

Table 5-4
Airfield Demand Versus Capacity
At Tehachapi Municipal Airport

Item	Actual 2001	Projected 2008	20013	2023
Annual Operations				
Demand	11,000	13,100	14,600	17,900
Capacity	230,000	230,000	230,000	230,000
% Capacity Utilized	5%	6%	6%	8%
VFR Hourly Operations				
Peak Hour Demand	5	6	7	9
Capacity	98	98	98	98
% Capacity Utilized	5%	6%	7%	9%

Source: Analysis by DMJM Aviation.

RUNWAY REQUIREMENTS

This section identifies runway requirements needed to satisfy the forecast demand in terms of crosswind coverage, runway length and other parameters, pavement strength requirement, and safety areas. Planning and design standards set forth in FAA AC 150/5300-13, Airport Design, for Airport Reference Code B-I form the basis of this analysis.

Crosswind Runway

According to FAA criteria in AC 150/5300-13, Airport Design, an airport's runway system should provide at least 95 percent wind coverage. This means that winds with a crosswind component exceeding the standard velocity for the airport's ARC should occur less than five percent of the time, on an annual basis. Wind coverage is based on a 10.5-knot (12 mile per hour) crosswind for ARC B-I. Based on the wind rose on the 1993 Airport Layout Plan (wind data for 1942-1944), the crosswind coverage is 97.69 percent. Wind data can be updated once sufficient meteorological data is available from the AWOS to be installed at the airport.

Runway Safety Area, Runway Object Free Area and Obstacle Free Zone

A Runway Safety Area (RSA) is defined as a rectangular area centered about the runway that is cleared, drained and graded. This area should be capable of accommodating an aircraft in the event that it veers off the runway, as well as fire fighting equipment. The ARC B-I criteria for the RSA is

an area 120 feet wide centered on the runway centerline and extending 240 feet beyond each stopway.

The Runway Object Free Area (ROFA) is a rectangular area surrounding the runway provided to enhance the safety of aircraft operations by having the area free of objects. Its clearing standard precludes parked aircraft and other objects, except those objects that need to be located there for air navigation or aircraft ground maneuvering purposes. The design standard for an ARC of B-I is a ROFA 250 feet wide centered on the runway centerline and extending 240 feet beyond the ends of the stopways.

The Obstacle Free Zone (OFZ) is an area of airspace centered about a runway that is required to be clear of all objects, except for frangible visual navaids that need to be located in the OFZ because of their function. The OFZ provides clearance protection for aircraft landing or taking off from the runway, and for missed approaches. The design standard for an ARC of B-I is an OFZ 250 feet wide centered on the runway centerline and extending 200 feet beyond the ends of the runway. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline.

The present airfield configuration accommodates the ARC B-I requirements for the widths of the RSA, ROFA and OFZ, and would accommodate the lengths of the RSA, ROFA and OFZ beyond the runway ends if the stopways were deactivated.

Runway Length

Runway length is a critical consideration in airport planning and design. Aircraft need sufficient runway lengths to operate safely under varying conditions of airport elevation, wind, temperature, and takeoff weight.

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

Aircraft performance and site characteristics are considered in analyzing runway length. The site characteristics include: airport elevation, temperature (mean maximum temperature of the hottest month), runway gradient and wind conditions. The FAA Airport Design (Version 4.2) software package contains a program to calculate typical runway requirements for various classes of aircraft. This model was applied, with the airport site characteristics and results shown in Table 5-5.

As seen in Table 5-5, the recommended runway lengths at Tehachapi Municipal Airport for small airplanes (less than 12,500 pounds) with approach speeds of 50 knots or more and less than ten passenger seats range from 3,930 to 5,460 feet. This is the category of aircraft predominantly using the airport now and expected to use the airport in the future.

Under existing conditions, the Runway 11 and 29 takeoff lengths of 4,035 feet satisfy the requirements for over 75 percent of these aircraft.

Table 5-5
FAA Recommended Runway Lengths
For General Aviation Airplanes

Airport and Runway Data	
Airport elevation	3998 feet
Mean daily maximum temperature of the hottest month	86.6° F
Maximum difference in runway centerline elevation	42 feet
Surface winds	calm
Runway Lengths Recommended for Airport Design	
Small airplanes with approach speeds of less than 30 knots	420 feet
Small airplanes with approach speeds of less than 50 knots	1,120 feet
Small airplanes with approach speeds of 50 knots or greater and less than 10 passenger seats	
75 percent of these small airplanes	3,930 feet
95 percent of these small airplanes	5,120 feet
100 percent of these small airplanes	5,460 feet
Small airplanes with approach speeds of 50 knots or greater and 10 or more passenger seats	5,460 feet

Sources: AC 150/5325-4A, Runway Length Requirements for Airport Design; DMJM application of FAA Airport Design (Version 4.2).

Runway Width

The runway width requirement is based upon the physical and performance characteristics of aircraft using the runway. The characteristics of importance are wingspan and approach speeds. FAA Advisory Circular AC 150/5300-13 specifies a runway width of 60 feet for ARC B-I. The 50 foot wide runway is being widened to 75 feet, which exceeds the 60 foot standard for the ARC B-I classification. The 75-foot width meets the standard for ARC B-II, which includes aircraft such as the Beech Super King Air, Beech 1900C, Cessna 441, and Cessna Citation III.

Runway Grades

The FAA standard for maximum longitudinal runway grade is 2.0 percent for the critical aircraft at Tehachapi Municipal Airport (Approach Category B). The runway conforms to this standard as the maximum gradient is approximately 1.17 percent, located west of the center of the runway. Generally the grades vary between 0.91 and 1.17 percent, averaging 1.05 percent.

A runway should have adequate transverse slopes to prevent the accumulation of water on the surface. A maximum transverse grade of 1.0 to 1.5 percent is recommended by FAA for Approach Category B. The runway meets the transverse grade requirement. The runway "crown" is located along the runway centerline.

Runway Blast Pads

Runway blast pads are surfaces adjacent to the ends of the runways provided to reduce the erosive effects of jet blast and propeller wash. Blast pad pavement should be strong enough to support the occasional passage of aircraft as well as emergency and maintenance vehicles. The existing stopways at each end of the runway serve as blast pads and provide adequate protection from blast and propeller wash erosion.

Pavement Strength

Runway 11-29 was previously rated as having pavement strength of 25,700 pounds[2] gross weight with single-wheel landing gear configurations. This is sufficient to accommodate all anticipated aircraft. However, due to significant cracking of runway pavement, the need for runway strengthening may be required. A project is underway to rehabilitate and widen the runway 25 feet on the northern side.

Runway Protection Zones

The Runway Protection Zone (RPZ) is an area at ground level that provides for the unobstructed passage of aircraft through the airspace above it, and is used to enhance the protection of people and property on the ground. Control of the RPZs by the airport owner is strongly encouraged by the FAA to prohibit unsafe uses within the RPZs. Control over the use of the RPZ area can be achieved through the acquisition of sufficient property interest. Presently, the City of Tehachapi does not have controlling interest in all the property within the RPZs (refer to Figure 3-3 for the location of the RPZs). The RPZ dimensions meeting ARC B-I criteria (for small airplanes) are shown in Table 5-3.

[2] Source: Airport Layout Plan, December 3, 1993

The RPZ for Runway 11 extends across State Route 58 (see Figure 3-3). The portion of the RPZ to the north and south of State Route 58 are classified as commercial use property. The City does not hold easements on the privately-owned portions of the Runway 11 RPZ.

The RPZ for Runway 29 extends across Dennison Road east of the airport (Figure 3-3). This RPZ is intersected by the railroad tracks, Tehachapi Boulevard, and Dennison Road. The portion of the RPZ closest to the runway contains airfield uses. The remainder of the RPZ is designated as commercial use. The City holds easements on privately-owned portions of the Runway 29 RPZ north of Tehachapi Boulevard.

RPZs should be kept free of all objects that are obstructions to air navigation. While it is desirable to clear all objects from the RPZ, some uses are permitted. Land uses prohibited from the RPZ are residences and places of public assembly. While the land uses in the present RPZs generally conform to FAA standards, not all the RPZ property is controlled by the City. The acquisition of easements by the City is recommended for RPZ areas not now controlled by the City.

Threshold Siting Surfaces

The Threshold Siting Surfaces are used to establish the location of runway thresholds to meet approach obstacle clearance requirements, particularly as they affect instrument approach visibility minimums. The Threshold Siting Surfaces are imaginary inclined planes extending from the runway threshold or from 200 feet beyond the threshold. The existing dimensions of these surfaces for Tehachapi Municipal are given in Table 5-3.

If an instrument approach procedure is provided for Runway 29, these dimensions would change. Objects should not penetrate these imaginary surfaces to allow the unrestricted flight of aircraft approaching the runways. In some cases penetrating objects can be lighted.

Some utility poles along Dennison Road were recently removed. These poles had previously established the location of the Runway 29 displaced threshold. An analysis of the height of the Threshold Siting Surface for Runway 29 and the heights of remaining objects at the end of the runway indicated that the displaced threshold can be relocated to approximately 375 feet from the end of the runway.

TAXIWAY REQUIREMENTS

Runway 11-29 is served by a full-length parallel taxiway to the south. There are three exit taxiways between the ends of the runway. The parallel taxiway is 30 feet wide. The exit taxiways vary in width from 30 to 75 feet.

A taxiway width of 25 feet is the standard to accommodate Airport Reference Code B-I aircraft (Table 5-3). Thus the taxiways at the airport exceed the standard width.

The existing runway-to-taxiway centerline separation for the parallel taxiway is 110 feet. This does not meet the ARC B-I standard of 150 feet. The ARC B-I standard for separation between the centerlines of a taxiway and a parallel taxilane is 69 feet. The parallel taxiway and taxilane separation at Tehachapi is 115 feet.

The separations between the parallel taxiway centerline and "fixed or moveable objects" meet or exceed the ARC B-I standard of 44.5 feet. The separations between the parallel taxilanes and "fixed or moveable objects" meet or exceed the ARC B-I standard of 39.5 feet.

NAVIGATIONAL AIDS, LIGHTING AND RELATED FACILITIES

Instrument Approach Capability

Currently, the FAA is in the process of evaluating the feasibility of a GPS approach at the airport, including the establishment of approach minimums if a GPS approach is possible. A GPS approach would require the installation of airfield signage, which could be provided as part of the runway improvement project.

Airfield Lighting and Marking

Runway 11-29 is equipped with high intensity runway edge lights (HIRLs) and basic runway markings. Lighting and marking requirements for a GPS approach are based on the visibility minimums. HIRL accommodates all visibility minimums. Taxiways are equipped with reflectors.

AIRPORT LANDSIDE FACILITIES

Administration Building

Although the administration building provides the necessary functions for airport administration and general aviation terminal uses, it has some drawbacks. The building most likely would not meet today's seismic and Americans with Disabilities Act standards, and no phone is provided for contacting Flight Services.

The option to expand, reconstruct the building, or build a new administration/terminal building at some future time should not be compromised. The master plan identifies a site for a new administration building to ultimately replace the existing building.

Aircraft Storage Hangars

The City maintains a hangar waiting list that contained approximately 6 names in August 2002. However, the waiting list in not a good indication of actual demand due to the fact the City rents only four hangars.

The potential demand for individual hangar space at Tehachapi Municipal was estimated by examining the percentage of hangars to total based aircraft at Tehachapi. Comparable general aviation airports within a 25-mile radius of the airport (see Table 3-1) showed a significantly lower percent of based aircraft that are hangared. The following four airports were considered in this analysis: California City, Mojave, Mountain Valley and Rosamond. These four airports have a total of 335 based aircraft and 178 individual hangar units (T-hangars or rectangular hangars). Thus, hangar spaces are 53 percent of based aircraft at these airports, compared with about 85 percent at Tehachapi Municipal in 2002.

This high percentage of hangared aircraft can be attributed to the severe weather extremes and winds common to Tehachapi. The hangar demand is projected to remain at 85 percent of based aircraft in the future.

The projected hangar demand represents a need to construct 11 additional hangars between now and 2010, another 8 between 2011 and 2015, and another 17 from 2016 to 2025 (Table 5-6). The estimated hangar demand assumes that the hangars could be built at a cost that would allow them to be rented at a competitive price. Further, before proceeding with any new hangar development, the City would need a market survey to further quantify the hangar demand at Tehachapi, and to assess the demand by size of hangar. Additionally, commitments should be obtained from lessees prior to development.

It is noted that shade ports could be considered an alternative to hangars. However, while not as costly as hangars, shade ports provide only limited protection from direct sun and snow, and would not provide protection from winds.

Aircraft Parking Ramp for Based Aircraft Tie-Downs

The requirements for based aircraft tiedown spaces were developed by subtracting the number of aircraft expected to be in individual and conventional hangars from the total based aircraft (Table 5-6). The resulting based aircraft tiedown requirements are a total of 12 in 2010, 13 in 2015, and 16 in 2025. There are a sufficient number of existing tiedowns (41) on the airport to accommodate forecasted demand through 2025.

Some short-term improvements to existing aircraft parking ramp areas are needed. It is noted that Benbow has aircraft parked on non-paved areas.

Transient Aircraft parking

Transient parking for aircraft not based at the airport is regularly provided by the City of Tehachapi as well as the FBO Benbow.

City Transient Parking. The City currently reserves 20 taxi-through tiedown spaces on the ramp east of the administration building for transient users. However, on a typical busy day an average of about 6 spaces are used. During special events at the airport or holiday weekends there can be as

many as 15 transient spaces occupied. The demand for this space is expected to increase in proportion to the increase in based aircraft. Using this approach, the demand for City transient spaces will increase to 10 in 2025 for a typical busy day. An additional 16 spaces are identified in 2025 to accommodate special events and holiday weekends.

Table 5-6
Aircraft Hangar, Tiedown and Transient Parking Requirements
Tehachapi Municipal Airport

Item	Actual 2002	Required 2010	Required 2015	Required 2025
Individual hangar requirement				
Total based aircraft	67	80	89	109
Hangars percent of based aircraft [a]	85%	85%	85%	85%
Number of individual hangars	57	68	76	93
Based aircraft tiedown requirement				
Total based aircraft	67	80	89	109
Less aircraft in individual hangars [b]	57	68	76	93
Less aircraft in conventional hangars	0	0	0	0
Number of based aircraft on tiedowns	10	12	13	16
Transient parking space requirement				
City transient parking for busy day	6	7	8	10
City transient parking for special events	9	11	13	16
Transient parking operated by Benbow	3	4	5	6
Total transient parking spaces	18	22	26	32

[a] The long-term hangar requirement percentage is assumed to remain at 85%.
[b] Some hangars have more than one aircraft. Future requirements assume all new hangars will have one aircraft each.
Source: Analysis by DMJM Aviation.

FBO Transient Parking. Benbow provides a total of 3 transient parking spaces, within their leasehold area. The FBO transient space requirements, based on this need increasing in proportion to the increase in based aircraft is 6 in 2025.

Aircraft Parking Ramp for Based Aircraft Tie-Downs

The requirements for based aircraft tiedown spaces were developed by subtracting the number of aircraft expected to be in individual and conventional hangars from the total based aircraft (Table 5-6). The resulting based aircraft tiedown requirements are a total of 12 in 2010, 13 in 2015, and 16 in 2025. There are a sufficient number of existing tiedowns (41) on the airport to accommodate forecasted demand through 2025.

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City Transient Parking. The City currently reserves 20 taxi-through tiedown spaces on the ramp east of the administration building for transient users. However, on a typical busy day an average of about 6 spaces are used. During special events at the airport or holiday weekends there can be as many as 15 transient spaces occupied. The demand for this space is expected to increase in proportion to the increase in based aircraft. Using this approach, the demand for City transient spaces will increase to 10 in 2025 for a typical busy day. An additional 16 spaces are identified in 2025 to accommodate special events and holiday weekends.

FBO Transient Parking. Benbow provides a total of 3 transient parking spaces, within their leasehold area. The FBO transient space requirements, based on this need increasing in proportion to the increase in based aircraft is 6 in 2025.

Fixed Base Operator Lease Area

The two fixed base operators (FBOs), Benbow Aviation and Mountain Hawk Aviation, lease about 2.3 acres. Benbow's lease is 2.1 acres and Mountain Hawk's lease is 0.2 acres.

Typically, the FBO lease area at small general aviation airports is on the order of five acres. This size is representative of FBOs that service small piston and turbo-prop aircraft (under 12,500 pounds), which are the size of aircraft normally serviced at Tehachapi Municipal. An FBO's space needs will depend on the services it provides, particularly the number of tiedowns and hangars it provides for based aircraft. At Tehachapi, a total of at least five acres of FBO space will be reserved for use to 2025.

Aviation Fuel Storage

Aviation Gas (Avgas). Bulk avgas storage requirements were determined for the airport based upon the forecast of aviation gas (avgas) flowage contained in Section 4. Avgas flow was projected in gallons pumped per peak month, which was estimated to be the same as the percentage of annual aircraft operations in the peak month (12.2 percent of annual). The bulk avgas storage requirement is determined on the basis of the projected consumption, using a 14-day storage capacity as a target (Table 5-7). Based on this approach, it was found that the existing avgas tanks totaling 12,000 gallons will provide adequate storage capacity through 2025. It is noted that a 30-day storage capacity can be accommodated if necessary.

Table 5-7
Aviation Fuel Storage Requirements
For Tehachapi Municipal Airport [a]

Item	Average 2000 - 2001	Required 2010	Required 2015	Required 2025
Aviation Gas (Gallons)				
Annual Flowage	37,700	44,500	49,600	60,100
Peak Month Flowage [b]	4,600	5,430	6,050	7,330
Average Day Flowage in Peak Month [c]	150	175	195	235
Storage Capacity (14-day reserve)	2,100	2,450	2,730	3,290
Storage Capacity (30-day reserve)	4,500	5,250	5,850	7,050

[a] Source: DMJM Aviation analysis.
[b] Estimated to be 12.2 percent of annual flowage, which is equal to the percent of operations in the peak month of 2001.
[c] Peak month divided by 31.

Vehicle Parking

The need for vehicle parking spaces is estimated to increase in proportion to the number of busy day aircraft operations. There will be a requirement for about 22 parking spaces in 2025. Available spaces number 49 (Table 5-8).

Table 5-8
Vehicle Parking Requirements
For Tehachapi Municipal Airport [a]

Item	Actual Spaces [b] 2002	Spaces Used on Busy Day 2002	Future Operations and Required Spaces		
			2010	2015	2025
Busy Day Aircraft Operations	42	-	52	58	71
Vehicle Spaces					
Terminal Area	11	2	3	4	5
Additional Terminal Parking - Unpaved	13	0	0	0	0
Mountain Hawk Aviation	10	6	7	8	10
Benbow	15	4	5	6	7
Total Spaces	49	12	15	18	22

[a] Source: DMJM Aviation analysis.
[b] Actual number of spaces excludes parking in tiedown or private hangar areas.

SUPPORT FACILITIES AND SERVICES

Aircraft Rescue and Fire Fighting (ARFF)

FAA Advisory Circular 150/5210-6C establishes recommended scales of fire fighting protection for general aviation airports. Presented in the Advisory Circular are two indices used in determining the level of protection based on the number of operations of aircraft by aircraft length category. 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.

Tehachapi Municipal is not expected to reach either Index 1 or 2 within the long range planning period.

As described in Section 3, The City of Tehachapi has a fire station within about 1 mile of the airport. In the event of an aircraft crash or other emergency, fire-fighting vehicles from the station can arrive at the airport within about three minutes from the time of dispatch.

Airport Security

The existing system of security fencing and restricted access gates at the airport provides adequate protection against theft, vandalism and related crimes. As previously noted the vehicle gate located on Benbow's leasehold is left open and monitored by the FBO. Further additions to security fencing and controlled access gates have been evaluated in response to recommendations for other airport facility improvements or modifications.

SUMMARY OF FACILITY REQUIREMENTS

Facility requirements are summarized in Table 5-9. An additional 14 acres is recommended to be reserved to satisfy airport needs to 2050. The airport property remaining after assigning the lands needed for aviation use to 2050 and beyond will be set aside for airport revenue supporting uses. Section 6 explores various layouts for aviation uses and alternative concepts for airport revenue supporting uses.

Table 5-9
Summary of Facility Requirements
Tehachapi Municipal Airport

Item	Actual	Requirement or Area Reserved			Additional Area Reserved
	2002	2010	2015	2025	To 2050
Individual Hangars					
Units	57	68	76	93	(40)
Acres					6.0
Based Aircraft Tiedowns					
Units	41	12	13	16	(20)
Acres					2.0
Transient Parking Spaces					
Units	23	22	26	32	(10)
Acres					1.0
FBO Acres	2.2	3.0	4.0	5.0	0
Admin. / Support Acres	0.6	0.6	3.0	3.0	0
Other Aviation Use Acres	0	0	0	5.0	5.0
Total Acres					14.0

Source: Analysis by DMJM Aviation.

SECTION 6
ALTERNATIVE DEVELOPMENT CONCEPTS

SECTION 6
ALTERNATIVE DEVELOPMENT CONCEPTS

INTRODUCTION

This section describes alternative concepts for long-range development at Tehachapi Municipal Airport. The development concepts address:

- The long-term aviation needs identified in Section 5, showing locations and possible layouts for needed aviation facilities. Aviation airside alternatives discuss runway, taxiway, and navigational aid issues. Aviation landside alternatives address the need for additional hangars for based aircraft, additional FBO space, areas for aviation industrial or related aviation uses, and administrative and support facilities. Access to future aviation facilities on the north side of the runway is also addressed. Vehicle parking, security fencing, and entry gate locations are also considered, although the concept plans do not show this level of detail.

- Airport revenue-supporting uses for those areas of the airport in which no ultimate aviation use is projected. Revenue-supporting uses will enhance the long-term financial viability of the airport, enabling the airport to continue providing necessary air transportation services to the Tehachapi area. Ultimate aviation uses are estimated by allowing for needs to 2050 and beyond, based on projected growth in airport activity. These needs are described in Section 5.

Two aviation landside development concepts and two revenue-supporting development concepts are presented. Either aviation concept could be matched with either revenue-supporting concept. For this reason, the aviation concepts are illustrated and discussed separately from the revenue-supporting alternatives.

A recommended development concept was prepared for both the aviation area and revenue-supporting area after review of this analysis by the City of Tehachapi, the Tehachapi Airport Commission, and the Airport Master Planning Advisory Committee (PAC), and after receiving comments from the public. The recommended concept plans were prepared by combining and refining features of the two alternatives for each area.

AIRPORT DEVELOPMENT ISSUES

Several issues will affect future development of airport property.

Drainage

In 1998, a comprehensive drainage study was undertaken to address drainage problems that became apparent following the construction of curb and gutter improvements in the housing area south of the airport. The findings of that study (documented in Tehachapi Airport Drainage Study, March 29, 2001, by Quad Knopf, Inc.) were:

- Flooding of buildings has been reported north of the Green Street entrance and at the north end of Mojave Street.
- Ponding has occurred in the east tiedown area, in the area behind the hangars immediately north of the trailer park, in the hangar area east of the Green Street entrance, and in the administration area.
- Erosion and siltation is present in the flooding areas described above and the westerly extension of the future road easement south of the Green Street entrance.
- Pavement deterioration is present in areas where ponding and flooding occurs.

The study recommended the following improvements to correct these problems:

- Replace the existing main surface channel north of the runway with an 84-inch pipe.
- Construct a storm water detention basin at the west side of the airport north of the runway for peak-flow reduction in the watershed north of the runway.
- Convert the existing storm water retention basin at the west side of the airport south of the runway to a detention basin and enlarge its capacity from 5 acre-feet to 12 acre-feet by deepening the basin.[1]
- Install an underground piping system to correct local drainage problems at the south side of the airport.

Future development of the airport must provide for on-site drainage improvements similar to those recommended in the 2001 Drainage Study. Particularly important to future land uses at the airport

[1] A retention basin provides a ponding area for temporary water retention during and after storms. A detention basin provides peak-flow water reduction during a storm and is recommended near airports because it does not present an attraction for birds.

are the need for a detention basin and the potential replacement of the main surface channel north of the runway.

Setback of Future Buildings from Runway

Future building restriction lines will be established at 350 feet from the future runway centerline. Building restriction lines (BRLs) at these locations will allow buildings to be built within FAR Part 77 height limitations (i.e., a 14-foot building at the BRL) with a future straight-in non-precision instrument approach procedure. While this would not require the relocation of existing buildings, it will establish the limits for future building construction on both sides of the runway.

Removal of Buildings

Two trailers at the southwest corner of the airport were recently removed. The three-unit hangar building at the southwest corner operated by the City is in very poor condition and may be removed in the short term. The removal of these buildings will provide an opportunity for further aviation development in that area.

Constraints on Southside Development and Opportunities for Northside Development

The south side of the airport property is nearly built out. Some limited space is available for hangars or other facilities on the south side by infilling small pockets of land around existing uses. Therefore, development on the north side will need to begin soon to accommodate growth in aviation activity.

Release of FAA Aviation Use Covenants for Revenue-Supporting Uses

Past and current agreements between the City and the FAA resulting from the receipt of federal funds for airport development obligate airport property for airport purposes according to the terms of the agreement. If any airport property so dedicated is not needed for present or future airport purposes, an amendment to or release from the agreement may be granted in accordance with the guidance contained in FAA Order 5190.6A, Airports Compliance Handbook, October 1, 1989. A release of the aviation use covenants is needed before airport lands can be used for revenue-supporting uses.

The FAA's decision to release, modify, reform, or amend an airport agreement will be based on the guidelines outlined below.[2]

Content of Written Owner Requests. Although no special form is required, an owner's request must be specific and indicate, as applicable, the following:

[2] This information is taken from FAA Order 5190.6A, Airports Compliance Handbook, October 1, 1989.

- What agreement(s) with the United States are involved.
- What is requested.
- Why the release, modification, reformation or amendment is requested.
- What facts and circumstances justify the request.
- What requirements of state or local law should be provided for in the language of an FAA issued document if the request is consented to or granted.
- What property or facilities are involved.
- How the property was acquired or obtained by the airport owner.
- What is the present condition and what present use is made of any property or facilities involved.
- What use or disposition will be made of the property or facilities.
- What is the fair market value of the property or facilities.
- What proceeds are expected from the use or disposition of the property and what will be done with any net revenues derived.
- A comparison of the relative advantage or benefit to the airport from sale or other disposition as opposed to retention for rental income.
- A plan identifying the intangible benefits, if any, accruing to the airport, the amount attributed to the intangible benefits and the merit of their application as an offset against the fair market value of the property to be released. The plan must be shown to be in accordance with the Airport Layout Plan and should also include as a minimum:
  - A statement of the airport's source and application of funds for the preceding 3 years,
  - A statement of future sources and application of funds needed for the continued operation and maintenance of the airport,
  - A statement of the financial capability and intent to accomplish the airport development included in the current NPIAS, and

Each copy of the request will have attached two scaled drawings showing all airport property and airport facilities which are currently obligated for airport purposes by agreements with the

United States. Other exhibits supporting or justifying the request, such as maps, photographs, plans and appraisal reports, shall be attached, as appropriate.

FAA Evaluation. When a request has been received, supported by the appropriate documentation and exhibits, an evaluation of the total effect of the owner's proposal is made. This evaluation includes consideration of pertinent factors such as:

- The past and present owner's compliance record under all its airport agreements and its actions to make available a safe and usable airport for maximum aeronautical use by the public, and evidence that the owner has taken or agreed to take all actions possible to correct noncompliance situations at the airport, if applicable.

- The reasonableness and practicality of the owner's request in terms of aeronautical facilities needed and the priority of the need.

- The net benefit to be derived by civil aviation and the compatibility of the proposal with the needs of civil aviation.

- Consistency with the guidelines for specific types of releases.

FAA Determination. The decision to grant or deny the request, based on the above evaluation factors, must be guided by the statutes, regulations and policy applicable to the specific types of agreements involved. In addition, it must be determined if an environmental assessment is required under Order 5050.4, Airport Environmental Handbook. Further, it must be determined that either:

- The public purpose for which a term, condition, or covenant of an agreement, or the agreement itself, was intended to serve is no longer applicable, or

- The release, modification, reformation or amendment of an applicable agreement will not prevent accomplishment of the public purposes for which the airport or its facilities were obligated, and such action is necessary to protect or advance the interest of the United States in civil aviation, or

- The release, modification, reformation or amendment will obligate the airport owner under new terms, conditions, covenants, reservations or restrictions determined necessary in the public interest and to advance the interests of the United States in civil aviation, or

- With the release, modification, reformation or amendment the rights and obligations of the owner will conform to the statutes of the United States and the intent of the Congress consistent with applicable law.

It is believed that these conditions can be met, and that the airport property necessary for revenue-supporting land uses as shown on the concept plans presented here can be released from FAA covenants.

CRITERIA FOR EVALUATING CONCEPT ALTERNATIVES

Alternative concepts have been evaluated according to criteria based on the master planning objectives, which are described in Section 1. The goal of the concept alternatives analysis was to identify the appropriate airport development that best satisfies the following criteria:

- Long Term Aviation Needs. Conceptual plans must address the long-term facility requirements identified in Section 5. Additionally, the plans must consider ultimate aviation needs.

- Safety of Aircraft Operations. The future development should meet current FAA planning and design criteria if feasible, particularly those that enhance the safety of air operations.

- Community and Environmental Compatibility of Aviation Facilities. The future development and operation of the airport must be sensitive to the environment and compatible with the surrounding community.

- Flexibility to Accommodate Change in Aviation Needs. The plans for future airport development must be flexible enough to accommodate changing needs that cannot be anticipated now.

- Efficiency of Construction Phasing and Operations. Construction of the proposed improvements should be implemented without interfering with existing operations. The future development at the airport should be configured and located to maintain or enhance the operational efficiency of the airport.

- Relative Financial Effectiveness and Enhancement of Airport Revenues. Aviation improvements must be cost-effective and be matched with the ability of the City to fund the improvements. Development of areas not needed for aviation facilities should enhance airport revenues to the greatest extent possible.

The alternative airport development concepts discussed below were prepared with the objective of satisfying these criteria.

AIRSIDE ALTERNATIVES

Several airside issues were evaluated – runway safety zones, potential instrument approach procedures, location of the Runway 29 displaced threshold, and the separation of the runway and the existing parallel taxiway. These are discussed below.

Runway Safety Zones

The FAA ARC B-I standards provide that runway safety areas (RSAs) and runway object free areas (ROFAs) extend 240 feet beyond the ends of the stopways. Existing stopways measure approximately 600 feet at the end of Runway 11 and 390 feet at the end of Runway 29. The existing airfield configuration does not allow for the standard RSAs or ROFAs between the stopway ends and airport property. The ROFA is 250 feet wide. The RSA, with a width of 120 feet, is contained within the ROFA. The RSA must be graded and free of ditches or other impediments to safe aircraft movement on the ground.

Alternatives to attain compliance with the FAA standards are:

- Establish sufficiently shorter stopways at each runway end to allow standard RSAs and ROFAs. In this alternative, the Runway 29 stopway would need to be shortened from 390 feet to about 180 feet to allow the RSA to avoid the drainage ditch at that end of the runway and provide the necessary ROFA. The Runway 11 stopway would need to be shortened from 600 feet to about 130 feet to allow the RSA to avoid the drainage ditch at that end of the runway. The existing stopway pavement would remain to provide a safety margin for aircraft overruns or short landings.

- Eliminate the designated stopways and extend the runways at each end to the extent possible while allowing standard RSAs and ROFAs. The existing stopway pavement would remain to provide a safety margin for aircraft overruns or short landings. Under this alternative, the runway could potentially be extended approximately 180 feet to the east and 130 feet to the west to provide additional takeoff distance. The westerly extension would allow for a future storm water detention basin north of the Runway 11 end. The south parallel taxiway would need to be extended to the new runway ends and runway lighting would need to be modified.

- Eliminate the designated stopways and retain the existing runway ends. With this option, the existing stopway pavement would remain to provide a safety margin for aircraft overruns or short landings, but the pavement would not be designated as stopways. Standard RSAs and ROFAs would be provided at each end of the runway.

The stopways were constructed to allow the runway to be used for a specific corporate jet use. That user is no longer at the airport, and the stopways now have a limited usefulness. The additional takeoff distance that could be gained under the second alternative is not sufficient to warrant the

additional cost of new taxiway construction and runway lighting modifications. Under the third alternative described above, the stopway pavement would remain to provide a safety margin, including additional pavement for accelerate-stop distance if needed. Therefore, it is recommended that the existing stopway pavement remain but no longer be designated as stopway, and standard RSAs and ROFAs be provided at the existing runway ends.

Instrument Approach Procedures and Future Building Restriction Lines and Runway Protection Zones

The FAA is currently evaluating the feasibility of a non-precision global positioning system (GPS) approach procedure for the airport. If a GPS approach system can be implemented, it would permit landings under adverse weather conditions and extend the time the airport can be used.

Regardless of the feasibility of an instrument approach at this time, planning for new airport buildings should protect for a future instrument approach procedure. A future building restriction line (BRL) located 350 feet from the relocated runway centerline is recommended to protect for a non-precision instrument approach procedure. The future BRL would allow a building 14 feet high at the BRL to meet the Federal Aviation Regulations Part 77 height criteria for runways with a straight-in non-precision instrument approach procedure. A small portion of private property is located within the future BRL near the airport terminal building.

A runway protection zone (RPZ) that is 1,000 feet long with an inner width of 250 feet and an outer width of 450 feet will allow instrument approaches with a visibility of one mile for small aircraft. An RPZ of this size is recommended. It is further recommended that the City obtain easements on property within the RPZs not under public ownership.

Displaced Threshold for Runway 29

The Runway 29 threshold is currently displaced 550 feet, which was necessary because of utility poles that were east of the Runway 29 end. Several poles which were critical obstructions were recently removed, allowing the amount of displacement to be reduced now. A threshold siting analysis was done following the methodology contained in FAA Advisory Circular 150/5300-13 Change 7, Airport Design, October 1, 2002, Appendix 2, Threshold Siting Requirements. In addition to meeting these requirements, the threshold was located such that objects do not penetrate 7:1 transitional surfaces on each side of the Threshold Siting Surface to satisfy State of California requirements.

From this analysis, it has been concluded that the Runway 29 threshold can now be relocated to 375 feet from the runway end and meet the FAA threshold siting criteria for a visual runway.[3] If an instrument approach procedure using Runway 29 is developed at the airport in the future, the

[3] The FAA standard applied is for visual runways (daytime and nighttime) expected to serve small airplanes (no more than 12,500 pounds maximum takeoff weight) with approach speeds of 50 knots or more. This surface starts at the runway threshold, where it is 250 feet wide, and reaches a maximum width of 700 feet. The slope of the surface is 20:1.

threshold would likely need to be relocated at that time to provide a greater displacement than 375 feet. Figure 6-1 shows the utility poles removed and the remaining tall objects that were examined as potential candidates for affecting the Runway 29 threshold location. These candidate objects were verified by field observation by airport staff to be the tallest objects in the vicinity, including the area under the threshold siting surface. Heights of objects such as utility poles, street lights, and the railroad crossing arms were obtained from the respective operating agencies by airport staff.

Table 6-1 contains the analysis of the top elevations of objects, elevations of threshold siting surface at the objects, and threshold displacement needed. This analysis shows that the critical objects for the Runway 29 threshold location are Object No. 9 (the street light near the intersection of Dennison Road and Goodrick Drive) under the Threshold Siting Surface and Object Nos. 4, 6, and 7 (utility poles) under the transitional surface. With the new displaced threshold location, these objects will be one foot or more below the Threshold Siting Surface or transitional surface.

Separation of Runway and South Parallel Taxiway

As described in Section 5, the separation of the runway and south parallel taxiway is 110 feet. The separation is being increased to 122.5 feet with the widening of the runway. The FAA's ARC B-I standard is 150 feet. The taxiway centerline could be relocated 27.5 feet to the south to meet the B-I standard while continuing to meet the standards for taxiway-taxilane separation at the east end, and separation between taxiway and objects at the west end (such as parked airplanes and buildings). However, movement of the taxiway 27.5 feet would be at a considerable cost.

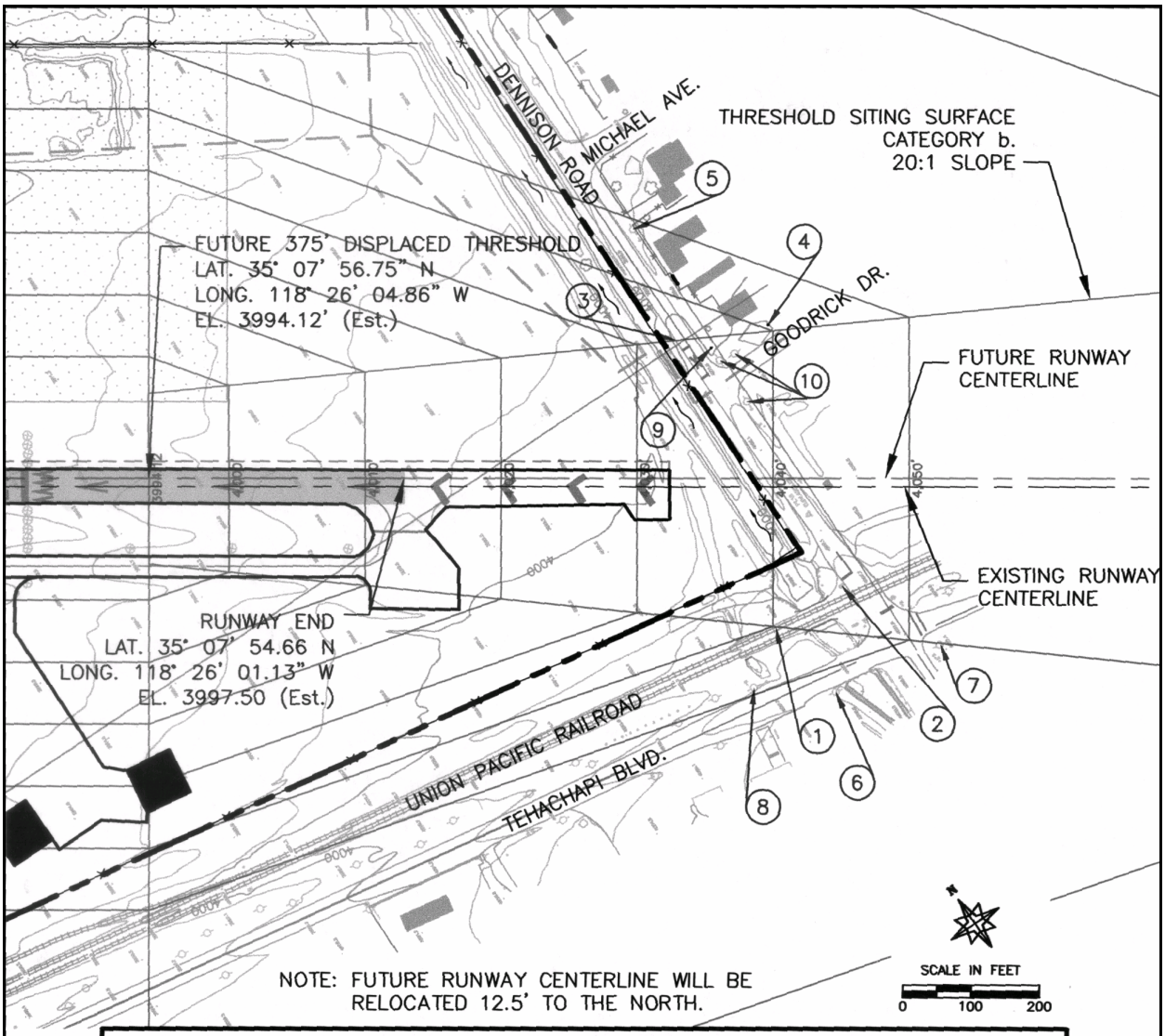
Although the runway-taxiway separation does not pose a safety hazard for visual operations, it could affect the feasibility of an instrument approach procedure. The Master Plan provides for the relocation of this taxiway in the long-term planning phase (Phase 3) to meet FAA standards.

ALTERNATIVE AVIATION LANDSIDE DEVELOPMENT CONCEPTS

Initial Screening of Aviation Development Options

Three initial aviation landside development options were prepared for the long-term aviation use areas. The optional plans featured differences in location of future airport facilities and differences in the overall shape of the ultimate aviation use area. These alternatives were reviewed by airport staff and the PAC on October 15, 2002. The following comments on the options provided further guidance on the future development of aviation and airport revenue-supporting areas:

- Aviation development in the southwest corner must respect the present and future needs for the storm water basin in that area.



OBJECTS

#	DESCRIPTION	TOP ELEVATION
1	R.R. TRACKS AT EDGE OF THRESHOLD SITING SURFACE	4,030'
2	R.R. CROSSING ARM AT DENNISON RD.	4,037'
3	DENNISON RD. AT EDGE OF THRESHOLD SITING SURFACE	4,016'
4	POLE ALONG GOODRICK DR.	4,040'
5	POLE ALONG DENNISON RD. SOUTH OF MICHAEL AVE.	4,037'
6	POLE AT SW CORNER OF TEHACHAPI BLVD. AND DENNISON RD.	4,054'
7	POLE AT SE CORNER OF TEHACHAPI BLVD. AND DENNISON RD.	4,051'
8	POLE ALONG R.R. TRACKS WEST OF DENNISON RD.	4,033'
9	FUTURE STREET LIGHT AT DENNISON RD. AND GOODRICK DR.	4,030'
10	POLES THAT HAVE BEEN REMOVED	N/A

Figure 6-1
Runway 29 Threshold Siting Analysis

Table 6-1
Analysis of Threshold Siting for Runway 29 at Tehachapi Municipal Airport Based on Visual Approach and Relocated Runway Centerline

Object	Height of Object (Feet AGL)	Ground Elevation at Object (Feet MSL)	Top Elevation of Object (Feet MSL)	Elevation of Threshold Siting Surface at Object Assuming No Displacement (Feet MSL)	Penetration of Object Above Threshold Siting Surface (Feet)	Displaced Threshold Needed to Clear Object Based on FAA Threshold Siting Criteria (Feet) [a]	Analysis Based on 375-Foot Displaced Threshold							
							Elevation of Threshold Siting Surface at Object (Feet MSL)	Threshold Elevation (Feet MSL)	Threshold Displacement (Feet)	Distance of Object from Rwy End (Feet)	Distance from Threshold to Object (Feet)	Clearance of Threshold Siting Surface Above Object (Feet)	Threshold Siting Transitional Height	Threshold Siting Transitional Surface Above Object (Feet)
1. R.R. Tracks at edge of Threshold Siting Surface	23	4,007	4,030	4,028	2	60	4,042	3,994	375	576	951	12	[c]	[c]
2. R.R. Crossing Arm at Dennison Rd.	30	4,007	4,037	4,030	7	200	4,045	3,994	375	644	1,019	8	[c]	[c]
3. Dennison Road at edge of Threshold Siting Surface	15	4,001	4,016	4,020	(4)	None	4,033	3,994	375	411	786	17	[c]	[c]
4. Pole Along Goodrick Dr.	39	4,001	4,040	[b]	[b]	[b]	4,040	3,994	375	536	911	[b]	4041	1
5. Pole Along Dennison Rd. South of Michael Av.	39	3,998	4,037	[b]	[b]	[b]	4,030	3,994	375	337	712	[b]	4048	11
6. Pole at SW Corner of Tehachapi Bl. & Dennison Rd.	44	4,010	4,054	[b]	[b]	[b]	4,045	3,994	375	635	1,010	[b]	4055	1
7. Pole at SE Corner of Tehachapi Bl. & Dennison Rd.	44	4,007	4,051	[b]	[b]	[b]	4,052	3,994	375	788	1,163	[b]	4053	2
8. Pole Along R.R. Tracks West of Dennison Rd.	27	4,006	4,033	[b]	[b]	[b]	4,039	3,994	375	515	890	[b]	4049	16
9. Street Light at Dennison Rd. & Goodrick Dr.	30	4,000	4,030	4,021	9	240	4,035	3,994	375	452	827	5	[c]	[c]

AGL = above ground level. MSL = mean sea level.
[a] Based on visual runways without a circling approach. Threshold Siting Surface starts at runway end, where it is 250 feet wide.
[b] Not under threshold siting surface.
[c] Not under threshold siting transitional surface.

- Aviation development on the north side of the runway should be a priority, as the south side is nearly built out.

- There could be an immediate need for additional hangar development, potentially on the south side of the runway.

- Potential funding sources for aviation development could include redevelopment agency funds (for infrastructure) or Americans with Disabilities Act funds (for terminal).

- Land use plans for the revenue-supporting area must be attractive to companies that would want to lease property rather than buy it.

- The City ultimately needs a marketing plan for the revenue-supporting area.

The three initial aviation development options varied with respect to shape and size of the area available for revenue-supporting uses. The relative opportunities and constraints of each revenue-supporting area were evaluated to determine the location for revenue-supporting uses that would be most attractive for leasing. The revenue-supporting area chosen was the one that maximizes revenue-supporting land at the intersection of SR58 and Dennison Road and along Dennison Road. All airport property west of Tehachapi Hill and adjacent to the runway is to be reserved for aviation uses. The remainder of property north of the runway will be dedicated to revenue-supporting uses.

The aviation landside development concepts discussed next are refinements of the three initial options, with all aviation development located in the aviation use area chosen. Many land use options and configurations were considered for development of this aviation use area. The various configurations were evaluated and reduced to two aviation development concepts, illustrated in Figures 6-2 and 6-3. These were compared with the no-build concept in the analysis discussed below.

The plans show aviation development in four phases, corresponding to the time periods for the forecasts and facility requirements: Phase 1 (2003 to 2010), Phase 2 (2011 to 2015), Phase 3 (2016 to 2025), and Phase 4 (areas reserved for aviation uses from 2026 to 2050).

Overview of Refined Aviation Landside Development Concepts

Features of Concepts. The concepts differ primarily in the location and phasing of aviation development. Nearly all new aviation development would need to be on the north side of the field due to the build-out of essentially all of the available south side areas. Some hangars can be built at the southwest corner of the airport once several buildings are removed. Other small pockets of land on the south side, particularly southeast of the runway, could accommodate some limited development.

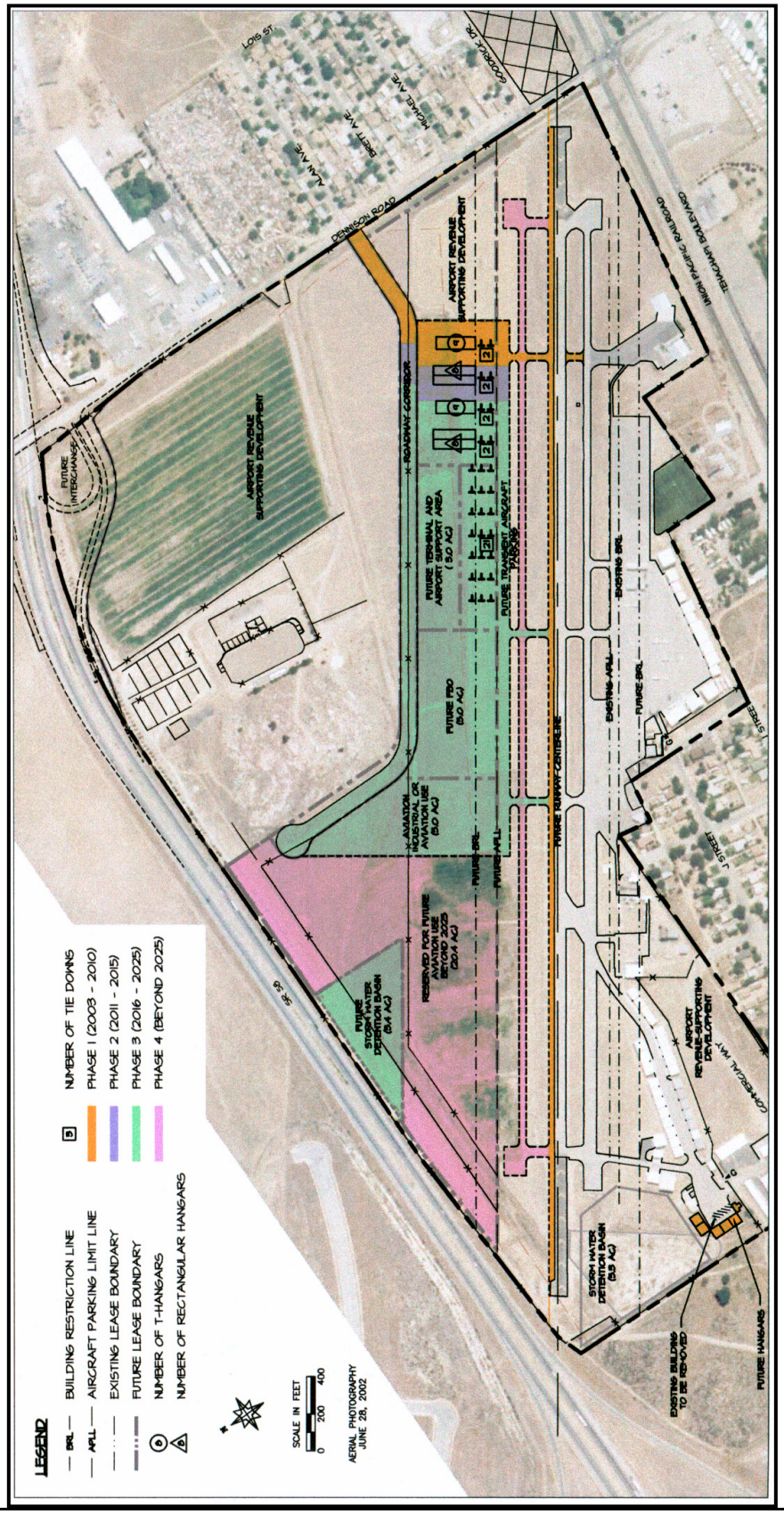


Figure 6-2
Aviation Landside Concept 1

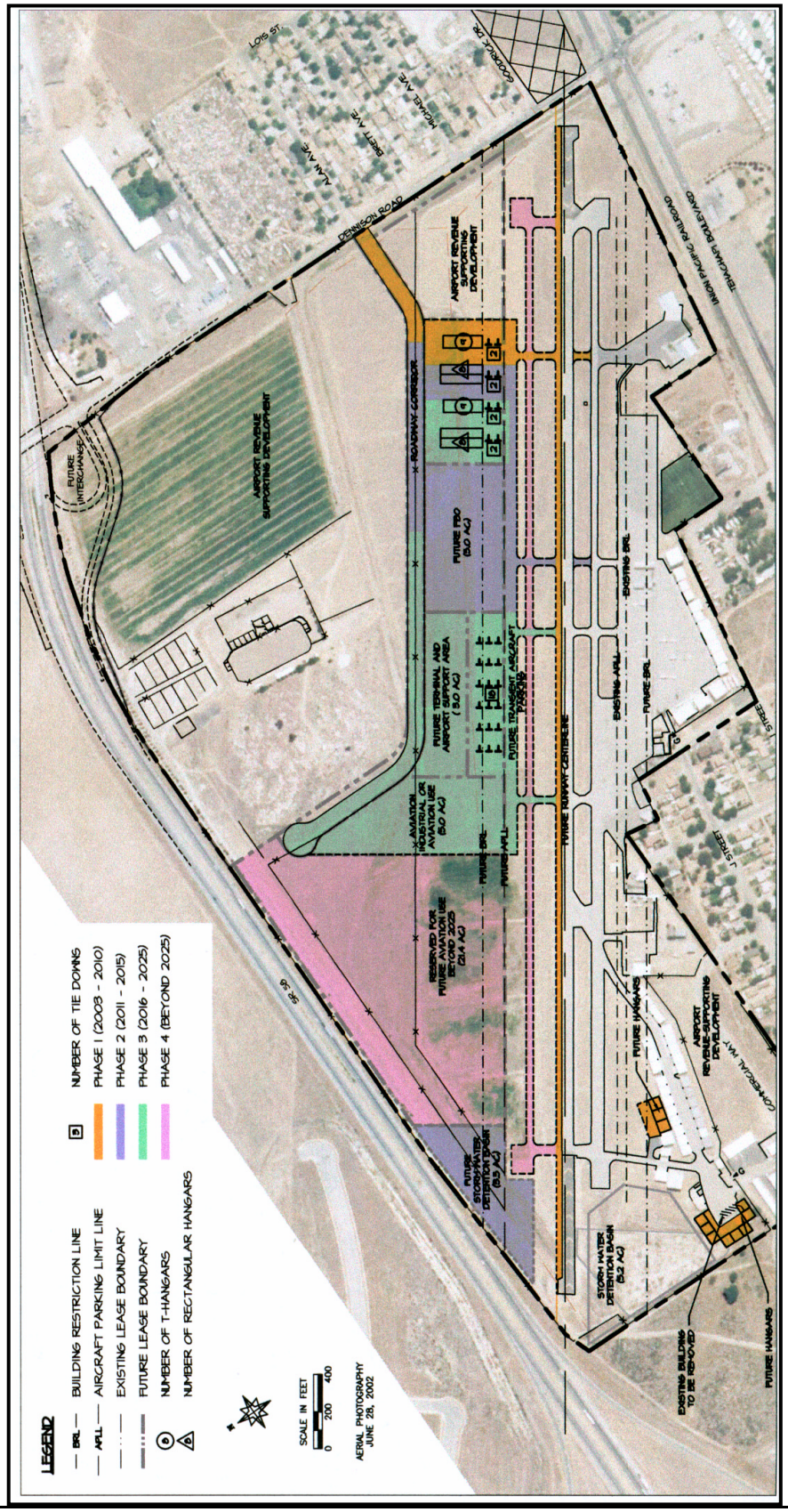


Figure 6-3
Aviation Landside Concept 2

All of the alternatives meet or exceed the 2025 aviation needs, and the estimated area reserved to accommodate 2050 aviation demands exceeds those projected needs, described in Section 5. Table 6-2 summarizes the aviation facilities provided by each concept and compares those facilities with existing facilities and 2025 and 2050 needs.

Table 6-2
Comparison of Aviation Facilities Provided Under Each Aviation Use Concept
Tehachapi Municipal Airport

Item	Actual 2002	Required	Provided by Concept		
			Aviation Landside Concept 1	Aviation Landside Concept 2	No Build
2025 Comparison					
Individual Hangars	57	93	97	102	57
Based Aircraft Tiedowns	41	16	49	49	41
Transient Parking Spaces	23	32	44	44	23
FBO Acres	2.2	5.0	7.2	7.2	2.2
Admin. / Support Acres	0.6	3.0	3.0	3.0	0.6
Other Aviation Use Acres	0	5.0	5.0	5.0	0
Comparison for 2025 to 2050					
Individual Hangar Acres	--	6.0	--	--	--
Based Tiedown Acres	--	2.0	--	--	--
Transient Parking Acres	--	1.0	--	--	--
Other Aviation Use Acres	--	5.0	--	--	--
Total Acres, 2025 to 2050	--	14.0	20.4	21.4	--

Source: Analysis by DMJM Aviation.

Standards Applied. For purposes of illustration in the concept plans, new hangars and taxilanes have the following dimensions:

- T-hangar buildings are 54 feet wide and contain multiple units in a "nested" configuration. Taxilanes serving T-hangars are 60 feet wide. T-hangar units have a clear door opening of 41.5 feet by 12 feet and are 33 feet deep.

- Rectangular hangar units have a clear door opening of 44.5 feet by 14 feet, and are 41 feet deep. Taxilanes serving rectangular hangars are 70 feet wide.

The ultimate hangar dimensions will depend on the specific needs identified at the time of development.

All aviation concepts are based on the following standards:

- A future Building Restriction Line (BRL) is established at 350 feet from the relocated runway centerline on both sides of the runway (the existing BRL on the south side is 250 feet from the runway centerline). This will not require the relocation of existing buildings on the south side, but will protect against future construction that could limit the minimums for potential instrument approach procedures. Note that the runway centerline will be relocated 12.5 feet to the north with the runway widening project because the additional 25 feet of width will be added to the north side of the runway.

- A future parallel taxiway on the north side will have a centerline separation of 150 feet from the relocated runway centerline in accordance with FAA standards for Airport Reference Code B-I. New taxiways would be built in stages to serve the north side as it is developed over the planning period.

- A future parallel taxilane on the north side will have a centerline separation of 69 feet from the new northside taxiway in accordance with FAA standards for Airport Reference Code B-I.

- The distance from taxilane centerline to parked airplane on the north side will be 39.5 feet in accordance with FAA standards for Airport Reference Code B-I.

Aviation Landside Concept 1

Aviation Landside Concept 1 (Figure 6-2) provides for limited hangar development at the southwest corner of the airport in Phase 1. Hangars could be built here by the City or the City could lease parcels of land in this area for private development. The adjacent storm water retention basin would be modified as described below to allow the hangar development. The remaining aviation development would occur primarily on the north side.

Under this concept, development would occur as follows.

Phase 1 (2003 to 2010). In Phase 1, space would be provided for 6 new hangars (5 rectangular hangars and 1 T-hangar) by removing the old City-owned 3-unit hangar building at the southeast corner.

The adjacent retention basin would be enlarged and converted to a detention basin as recommended in the 2001 Drainage Study. The capacity of the basin would be enlarged from 5 acre-feet to 12

acre-feet as recommended in that report. The basin, modified as shown in Figure 6-1, would need to be about 2.3 feet deep to provide 12 acre-feet of capacity.

Nine hangar units, with a taxiway connector to the runway, would be constructed on the north side of the runway. These hangars are illustrated as T-hangars but could be any combination of T-hangars and rectangular hangars, depending on demand. Access to the new northside hangar area would be via a new road intersecting Dennison Road at Alan Avenue. Utilities would be provided to this area. Phase 1 construction would include widening of the runway, taxiway and apron pavement rehabilitation, and a new automated weather observation system (AWOS). Optional construction could include the north side parallel taxiway during Phases 1 to 3, and a service road connecting the south side of the field with the north side in Phase 1.

Phase 2 (2011 to 2015). In Phase 2, the north access road would be extended and 8 new hangars would be constructed on the north side. These are illustrated as rectangular hangars but could be any combination of T-hangars and rectangular hangars.

Phase 3 (2016 to 2025). Phase 3 development, which would occur on the north side, would consist of extension of the north access road, 17 additional hangar units, a new general aviation terminal / administration building, additional transient aircraft parking, a 5-acre FBO site, and a 5-acre site for aviation industrial or other aviation-related use. Also shown in this phase is a new northside storm water detention basin. In this concept, the northside basin would be located as recommended in the 2001 Drainage Study. This basin would encompass about 3.4 acres. Although shown in Phase 3 for planning purposes, the timing and ultimate capacity of the basin have not been determined.

Phase 4 (beyond 2025). After 2025, the area reserved on the northwest side of the airport would be developed. The north parallel taxiway would be built in this phase, if not built sooner according to the optional development described under Phase 1.

Aviation Landside Concept 1 would provide a total of 97 individual hangar units, compared to an estimated 2025 requirement of 93. Other 2015 needs would be met or exceeded. Additionally, over 20 acres would be available for aviation development beyond 2025, exceeding the estimated 2050 needs (Table 6-2).

Aviation Landside Concept 2

Aviation Landside Concept 2 (Figure 6-3) provides for greater hangar development at the southwest corner of the airport in Phase 1. Hangars could be built here by the City or the City could lease parcels of land in this area for private development. The adjacent storm water retention basin would be modified in shape, similarly to Aviation Landside Concept 1.

Development under this concept would occur as follows.

Phase 1 (2003 to 2010). In Phase 1, space would be provided for 11 new rectangular hangars by removing the old City-owned 3-unit hangar building at the southeast corner. The adjacent retention

basin would be enlarged and converted to a detention basin as described for Aviation Landside Concept 1.

Nine hangar units, with a taxiway connector to the runway, and a new northside access road would be constructed on the north side of the runway as under Aviation Landside Concept 1. Phase 1 construction would include widening of the runway, taxiway and apron pavement rehabilitation, and a new automated weather observation system (AWOS). Optional taxiway and service road construction would be as under Aviation Landside Concept 1.

Phase 2 (2011 to 2015). In Phase 2, 8 new hangars would be constructed on the north side as under Aviation Landside Concept 1. These are illustrated as rectangular hangars but could be any combination of T-hangars and rectangular hangars. A 5-acre FBO site would also be provided in Phase 2 under this concept.

Also shown in this phase is the new northside storm water detention basin. In this concept, the northside basin would be located north of the Runway 11 end. This basin would encompass about 3.5 acres. Although shown in Phase 2 for planning purposes in this concept, the timing and ultimate capacity of the basin have not been determined.

Phase 3 (2016 to 2025). Phase 3 development would consist of 17 additional hangar units, a new general aviation terminal / administration building, transient aircraft parking, and a 5-acre site for aviation industrial or other aviation-related use, all on the north side.

Phase 4 (beyond 2025). After 2025, the area reserved on the northwest side of the airport would be developed. The north parallel taxiway would be built in this phase, if not built sooner according to the optional development described under Phase 1.

Aviation Landside Concept 2 would provide a total of 102 individual hangar units, compared to an estimated 2025 requirement of 93. Other 2015 needs would be met or exceeded. Additionally, over 21 acres would be available for aviation development beyond 2025, exceeding the estimated 2050 needs (Table 6-2).

EVALUATION OF ALTERNATIVE AVIATION LANDSIDE DEVELOPMENT CONCEPTS

The alternative aviation development concepts were evaluated according to the criteria described at the beginning of this section. A summary evaluation matrix is presented as Table 6-3. Concepts are rated as excellent, good, fair or poor with respect to each criterion.

Table 6-3
Summary of Evaluation of
Alternative Aviation Landside Concepts

Criterion	Aviation Concept 1	Aviation Concept 2	No Build [a]
Long Term Aviation Needs	Excellent – land identified for aviation use meets or exceeds all aviation needs to 2025 and exceeds needs to 2050.	Excellent – land identified for aviation use meets or exceeds all aviation needs to 2025 and exceeds needs to 2050. Provides greater aviation area beyond 2025 than Concept 1.	Poor – Does not meet future aviation needs.
Safety of Aircraft Operations	Excellent - Satisfies essentially all FAA airport design standards. [b]	Excellent - Satisfies essentially all FAA airport design standards. [b]	Excellent - Satisfies essentially all FAA airport design standards. [b]
Community and Environmental Compatibility	Excellent - No new non-compatible development.	Excellent - No new non-compatible development.	Excellent - No new non-compatible development.
Flexibility to Accommodate Changing Needs	Excellent - Provides a good mix of aviation uses on north side, while reserving lands for future needs.	Excellent - Provides a good mix of aviation uses on north side, while reserving lands for future needs.	Poor – Does not address future aviation needs, although flexibility is maintained.
Efficiency of Construction Phasing and Operations	Excellent – New development will not impact existing operations.	Excellent – New development will not impact existing operations. Makes greater use of south side hangar development opportunity.	Does not apply.
Relative Financial Effectiveness and Enhancement of Revenues	Good – Maximizes revenue-supporting area while providing for ultimate aviation needs. Minimizes costs to develop north side in early phases.	Good – Maximizes revenue-supporting area while providing for ultimate aviation needs. Minimizes costs to develop north side in early phases.	Poor – Does not enhance airport revenues.

[a] Assumes construction projects underway will be completed.
[b] An exception is the separation between the runway and the existing south parallel taxiway.
Source: Analysis by DMJM Aviation.

Aviation Landside Concept 1

Advantages of this concept are:

- Provides phased development to accommodate all aviation needs projected to 2025.
- Exceeds estimated aviation needs beyond 2050.
- Maximizes the amount of high-value revenue-supporting property.
- Provides for 6 new hangar spaces at the southwest corner while minimizing new pavement costs in that area.
- Provides areas for FBO and other aviation uses to enhance airport revenues.
- New access road intersecting Dennison Road will allow convenient vehicle access to aviation use areas.
- Provides for incremental expansion on the north side while limiting infrastructure costs to those needed for each phase.
- Provides a hangar complex on the north side that can be developed by the City with a range of hangar options.
- Allows all airport areas to remain operating while new facilities are constructed
- Plan provides the flexibility to meet changing needs.
- Implements some recommendations of the 2001 Drainage Study (enlarging the storm water basin in the southwest corner and constructing a new one on the north side).
- Community compatibility is retained.

Disadvantages are:

- Development of the north side for aviation uses will require construction of a new airport access road with Dennison Road intersection, utilities and drainage improvements, and new taxiways.
- Does not provide as much southside hangar development as Aviation Landside Concept 2.
- Does not provide as much aviation use area on the north side as Aviation Landside Concept 2.

Aviation Landside Concept 2

Advantages of this concept are the same as Aviation Landside Concept 1, except:

- Provides for 11 new hangar spaces in two locations at the southwest corner but will require new pavement in those areas
- Provides a greater aviation use area on the north side

Similarly to Aviation Landside Concept 1, this concept will require construction of a new airport access road with Dennison Road intersection, utilities and drainage improvements, and new taxiways for development of the north side for aviation uses.

Conclusions

On December 10, 2002, a joint meeting of the Tehachapi Airport Commission and the Airport Master Plan Advisory Committee was held to discuss the airport master plan concepts. A public meeting followed in which comments from the public were received. As a result of comments from these meetings, a refined aviation development concept plan was prepared (see Figure 6-4). The recommended aviation concept plan follows Aviation Landside Concept 2 with some refinements related to the proposed roadway system and taxiway phasing.

REVENUE-SUPPORTING OBJECTIVES AND GOALS

The following summarizes the analysis, findings, and conclusions for the development of the portion of airport property identified as revenue-supporting property on the northeast corner of the airport. This parcel will not be required for aviation uses and therefore can be developed for commercial and employment uses to support the airport operation. The purpose is to identify a land use plan, circulation plan, and important design features that appear to respond best to the needs of the City and the constraints and opportunities of the site.

Key Site Characteristics

State Route (S.R. 58) currently has three main access points into the City: Tehachapi Boulevard on the western edge, Mill Street approximately one mile easterly of Tehachapi Blvd, and Steuber Road on the eastern edge of the City, approximately three miles east of Mill Street. The future Dennison Road interchange, projected to be complete in 2008, will become a centrally located fourth point of access. Of the two potential direct connections to the downtown area, Mill Street and Dennison Road, only Dennison Road currently crosses the Union Pacific Rail line. The completion of the interchange and the improvement of the Dennison Road corridor from S.R. 58 to Tehachapi Boulevard will provide a much improved traffic route to destinations such as downtown and the new high school. This will substantially increase the value of the frontage of the revenue-supporting parcel.

The existing land uses along Dennison Road directly east, range from an industrial recycle yard and manufacturing operations to single family residential. Improvements to the east and west enhance the new access as a main entry into the City.

The generally flat terrain of the 60-acre revenue-supporting property is strongly contrasted by the topographic landmark of Tehachapi Hill. The rise of the landform, approximately 70 feet above the ground plane, with it's rock laden appearance, provides a distinctive identity to the Dennison Road interchange relative to the other access points into the City. Upon completion of the interchange, the combination of the linkage to downtown via an improved Dennison Road and the identity of Tehachapi Hill provide the opportunities upon which the conceptual land plans are based.

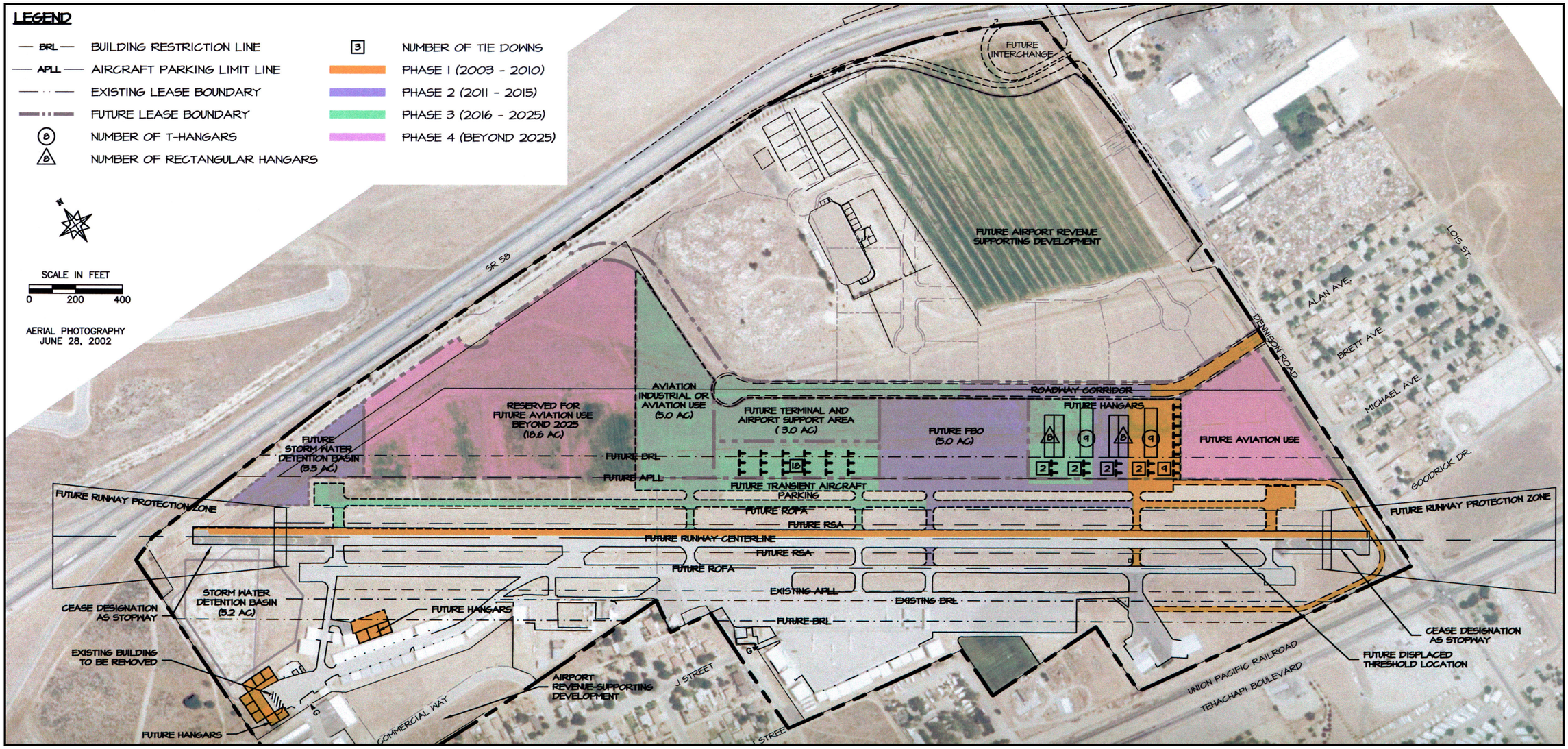


Figure 6-4
Recommended Aviation Concept Plan

Revenue-Supporting Objectives, Opportunities and Constraints

The project objectives listed below are based on discussions with City and airport staff regarding the potential commercial/employment development of this property and recent experience with similar types of projects in the Tehachapi area. Collectively, they describe the role a possible commercial development would play in the long-term plan for the airport property.

The objectives are as follows:

- The land use should provide a net income stream from land leases to support future airport operations and capital improvements.
- The proposed development should provide site identity and increased traffic along its frontage and thereby increase the value of the land over the long term.
- The project should be coordinated with adjacent land use plans and existing and planned circulation and infrastructure improvements.
- The development plan for the site should be very flexible so as to respond to the specific needs of future tenants in terms of size, configuration of parcel, and service requirements.
- The development plan should allow for phased development over time with near term, mid term, and long term uses.

Potential opportunities and constraints are as follows:

- The existing visibility of the site from S.R. 58, particularly for eastbound traffic.
- In addition to the current visibility, the future interchange will provide access adjacent to the airport parcel providing a value enhancing opportunity with the potential for a continuous right turn into the property from the eastbound off ramp of the freeway.
- A current surplus of available and relatively low cost land for commercial and industrial uses places the subject site in an economic disadvantage until more of that land is absorbed.
- The project site will be owned by the airport and leased to future users. There is not an opportunity for ownership in fee by a future user.
- The aviation demand for expanded facilities will not require this residual land to be needed for ultimate aviation purposes beyond 2050.

- The demand for land uses such as car rental or hotels sites would not be a requirement as often is needed for higher traffic airports. Therefore, the property development potential is for commercial, industrial and specialty uses oriented to the larger market context of the City of Tehachapi.

- The low traffic counts projected along Dennison Road would require the land use to have a specialty attraction to bring users to the site.

Implementation Goals

Due to the current availability of surplus land and lack of heavy user demand, it is expected that the airport's revenue supporting development will evolve over time slowly as demand increases. Pending the conceptual land plan to be implemented, the proposed land uses should be viewed in a changing market place over time. It is anticipated that this evolving use of the property would ultimately achieve the highest and best use for the land as the City grows. With the revenue-supporting property being dependent on the visibility and access to the S.R. 58 interchange, the use would be best served by the area between Dennison Road and Tehachapi Hill.

Long-Term Use. The long-term goal is to provide benefits both for the airport and for the greater community through the Dennison Road interchange and Dennison Road improvements to Tehachapi Boulevard. This will provide a new gateway to the downtown area and high school. The improved access will be a key first step in assisting the revitalizing of the downtown area. In addition, the anticipated increased vehicular trips would provide some of the needed exposure to the airport's development land frontage thereby increasing its value.

Recommended improvements would be:

- Identify Dennison Road as a new gateway to downtown. Enhance Dennison Road with wide parkways, landscaping and sidewalks.

- Provide a primary and secondary point of access to the property for improved circulation and flexibility for development phasing. Provide a continuous right turn lane into the airport property for the primary entrance. Use the secondary access to assist in serving the airport-related land uses.

- Design an underlying commercial/industrial map to allow maximum flexibility of lot sizes to respond to future users and market conditions.

- Enhance Tehachapi Hill as a landmark identity for the City at large as well as identity for the airport parcel.

Mid-Term Use. The mid-term goal is to provide a specialty land use incorporating the Tehachapi Hill landmark. A well designed specialty use for this landmark will significantly improve the identity of the property and provide interest in using the Dennison Road access. The

developing of a land use that takes advantage of the hill as a landmark will also provide the City with an identity feature.

Potential mid-term uses are:

- Theme Restaurant.
- Community overlook.
- Community resource.
- City of Tehachapi signage integrated into this landform.

Near-Term Use. The near-term goals are to prepare the site to be flexible pending future market demands, initiate and market interim revenue generating uses to enhance airport revenues, and provide low impact users with short-term renewable leases that could be converted to long-term users and leases.

Mapping for 2.5-acre sites would provide flexibility for future long-term users (whether large or small) with the option of anchoring several lots or a single parcel.

Potential near-term uses are:

- RV camping.
- Seasonal amusement park (summer carnival, go-cart track, summer and fall festivals, farmers market).
- Sports fields (rodeo, baseball tournaments, etc.).
- Park and ride.
- Truck stop.

The proposed program is anticipated to provide the highest and best use of the property in the long term as well as on an interim basis. It is anticipated that the street improvements would require outside funding sources or grants which would improve the airport land as well as assist in revitalizing the downtown and improve access to the new high school.

ALTERNATIVE REVENUE-SUPPORTING DEVELOPMENT CONCEPTS

The revenue-supporting land plans have been designed based upon two program alternatives.

- Grid Layout (Revenue-Supporting Concept A) - A grid layout plan has been designed to provide a development which is based upon the least amount of improvements with the maximum amount of flexibility. The absorption would be based on the discretion of the City and available uses seeking land.

- Mixed Use (Revenue-Supporting Concept B) - A mixed use plan has been designed to provide a development which is based upon the positioning of the airport parcel as a

distinctive location in Tehachapi. The absorption of the property would be based upon the diversity of the user, (whether commercial, industrial, or specialty) pending the strengths of these market segments over time.

The two concepts are illustrated in Figures 6-5 through 6-7 (Revenue-Supporting Concept A) and Figures 6-8 through 6-10 (Revenue-Supporting Concept B).

Revenue-Supporting Concept A - Grid Layout

The basic road configuration (Figure 6-5) is comprised of a roadway (Street 'A') that parallels the S.R. 58 right-of-way providing access to parcels with excellent freeway visibility. These parcels are approximately 350 feet deep and are oriented to larger freeway oriented tenants. A second street (Street 'B') connects to Street 'A'. The storm drainage channel is relocated along the south edge of the revenue-supporting property area.

The basic road configuration provides a wide range of lot-size options for potential users. The road configuration defines three major development areas, indicated as areas I, II and III. A conceptual lot plan is shown on Figure 6-6 creating approximately 2- to 4-acre sites. However, lots can be combined in many ways to produce larger sites, and certain areas are well suited for subdivision into smaller sites.

The roadway and utility infrastructure can also be phased in small increments with both Streets 'A' and 'B' being constructed initially as temporary cul-de-sacs to open up the first development sites. The proposed Dennison Road median break also provides full movement access to parcels along the Dennison Road frontage.

The basic road configuration, as shown on Figure 6-5, can be augmented by additional roadways shown on Figure 6-7 (Streets 'D' and 'E') that facilitate further subdivision of the site into smaller lots for development. These additional roadways would be an option should the market be strongest for 1- to 1.5-acre lots. Streets 'D' and 'E' could be included either individually or together. Should the recommended median break in Dennison Road not be feasible, Street 'D' may be important to provide access to commercial parcels along Dennison Road that would otherwise have only right-in/right-out access.

The Concept A land use plan includes freeway oriented commercial uses between Street 'A' and S.R. 58. Commercial uses such as restaurants, auto service, retail services, and possible offices are located along the Dennison Road Frontage. The interior parcels are industrial, employment and commercial uses that require less visibility from surrounding major roadways.

Tehachapi Hill is designated for an identity feature, which could be a feature with reference to an individual use on the site, or to the entire site, or to the City of Tehachapi. Preferably, the identity feature would accomplish all three objectives. The identity feature would also tend to reinforce Dennison Road as a new gateway into Tehachapi.

Figure 6-5
Revenue-Supporting Concept A, Roadway Configuration

Figure 6-6
Revenue-Supporting Concept A, Large Lot Plan

Figure 6-7
Revenue-Supporting Concept A, Small Lot Plan

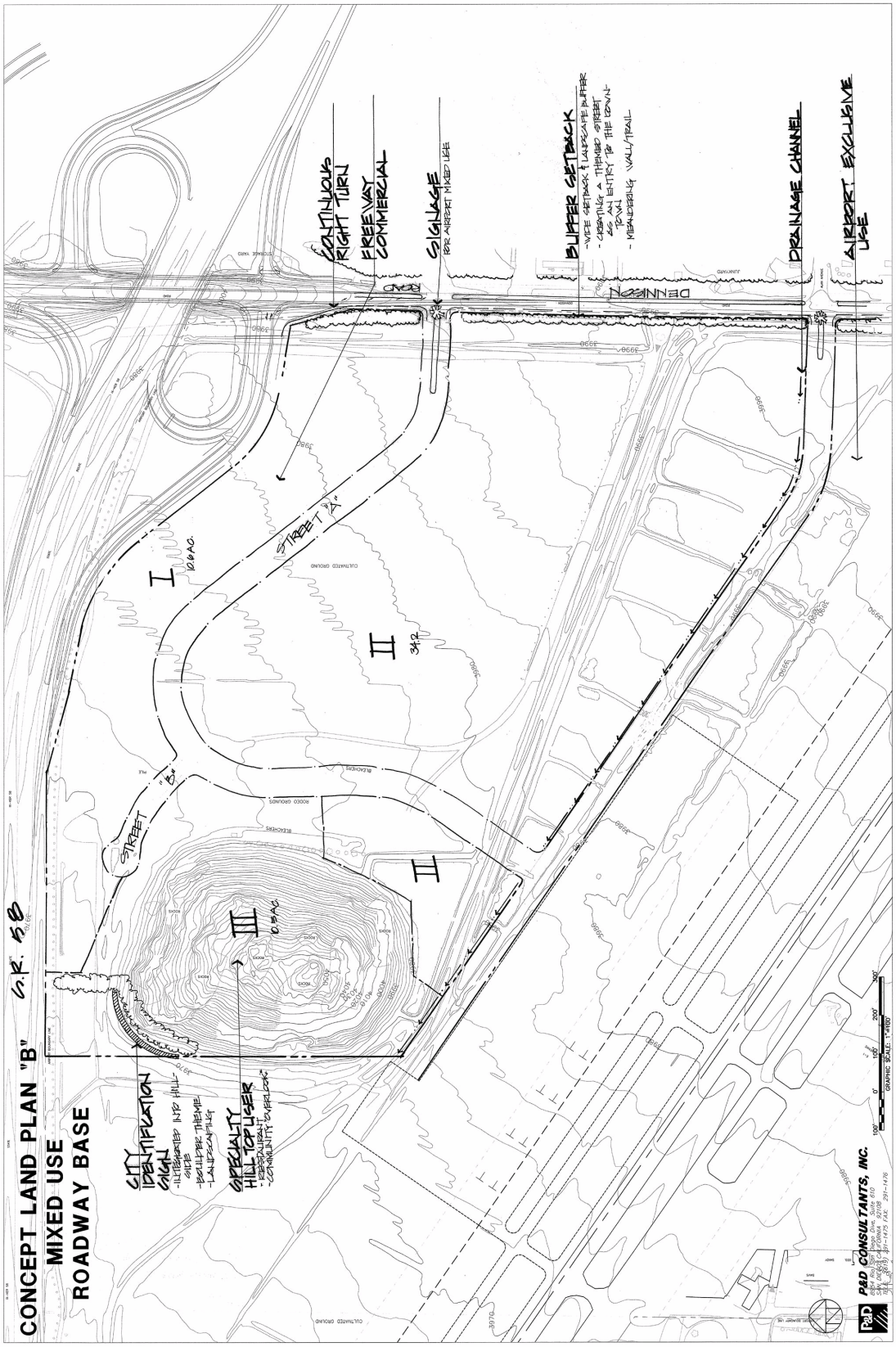


Figure 6-8
Revenue-Supporting Concept B, Roadway Configuration

Figure 6-9
Revenue-Supporting Concept B, Large Lot Plan

Figure 6-10
Revenue-Supporting Concept B, Small Lot Plan

A possible example of an identity feature that has been used in other areas is a theme restaurant that also features a farmers market with local produce. (and/or products made locally). The theme could be built around apples or the community's four seasons.

Structures as tall as 30 feet could be built on top of the hill and satisfy FAR Part 77 height-restriction standards. However, it is expected that any significant structures would be built at the base of the hill.

Revenue-Supporting Concept B - Mixed Use

The basic road configuration (Figure 6-8) is comprised of a roadway (Street 'A') that parallels the S.R. 58 right-of-way providing access to parcels with excellent freeway and off-ramp visibility. Those parcels are approximately 200 feet deep and are oriented to smaller freeway-oriented tenants as compared to Concept A. Street 'A' curves to the south. A second road (Street 'B') is a cul-de-sac street that provides access to potential lots near Tehachapi Hill. The storm drainage channel is relocated along the south edge of the revenue-supporting property.

The basic road plan provides a range of lot-size options with smaller lots adjacent to the freeway and larger interior lots. This is illustrated on Figure 6-9. The access to industrial lots along Dennison Road is from interior streets or right-in/right-out curb cuts. Similar to Concept A, the roadway and utility infrastructure can be phased in small increments with Street 'A' being constructed initially as a short, temporary cul-de-sac.

Figure 6-10 illustrates the basic road configuration which can be augmented by additional cul-de-sac roadways (Streets 'D' and 'E') that facilitate the further subdivision of the site into smaller lots for development. Streets 'D' and 'E' could be included either individually or together based on the market response to lot sizes.

The Concept B land use plan includes smaller lot freeway-oriented commercial uses between Street 'A' and S.R. 58. Interior lots accessing Street 'A' would be targeted for office and light manufacturing. The lots along the south end of the revenue-supporting area would be more industrial and manufacturing with some general design guidelines recommended for the entire site to maintain a consistent quality image. Convenience retail commercial would be located in small centers at the intersections of Dennison Road and Streets 'A' and 'B'.

The Tehachapi Hill is designated as the location of an identity feature similar to Concept A. In the context of this plan, the opportunity for a quality restaurant or other featured land use could be enhanced by the focus on higher quality tenants and design guidelines.

Conclusions

In order to increase the value of the land it is suggested that it requires a site identity and increased traffic and access along its frontage. This could occur through featuring Tehachapi Hill as a landmark and improving Dennison Road to increase traffic along the airport frontage.

This review of the site in the context of the City's development potential has resulted in the following conclusions:

- Of the four freeway access points to the City center, Denison Road will be the most direct with a crossing of the railroad.

- The Denison Road entrance to the City center has the most developable and the least encumbered parcel of land and therefore is well positioned to be developed as a gateway to Tehachapi.

- The enhancement of Denison Road as an entrance to the City center would continue to build upon the new City capital improvements to the street, sewer, storm drainage and residential walls.

- The design of another typical 5-acre subdivision would result in a significant delay in the absorption of the lots due to the current surplus of industrial/commercial property.

Recommendations and Implementation Plan

In the joint meeting of the Tehachapi Airport Commission and the Airport Master Plan Advisory Committee and the public meeting, which were held on December 10, 2002, the alternative development plans for revenue-supporting property were discussed. As a result of comments from these meetings, a refined revenue-supporting development concept plan was prepared (see Figure 6-11). The recommended revenue-supporting concept plan generally follows Revenue-supporting Concept A, but has some features of Concept B. Concept B features included in the recommended concept plan are the buffer strip along Dennison Road and the elimination of direct access from Dennison Road to lots along Dennison.

Based on the current market conditions for similar types of land uses, the grid layout (Concept A) provides a sound program for implementation. This approach will position the property for development with the maximum ability to adapt to a multitude of users. The grid street layout offers flexibility for the future, with the potential to phase infrastructure improvements as needed and to build, or not build (i.e., large lot plan), certain street segments based on the requirements of future tenants.

To implement these goals for the project the following means are suggested:

- Apply to FAA for release from the aviation use covenants for the revenue-supporting property shown in Figure 6-11. The application for release will include the airport property along Dennison Road as well as the existing airport industrial area at Commercial Way.

- Initiate studies to evaluate market, financial, and engineering/cost feasibility of developing the property with non-aviation revenue-support uses.

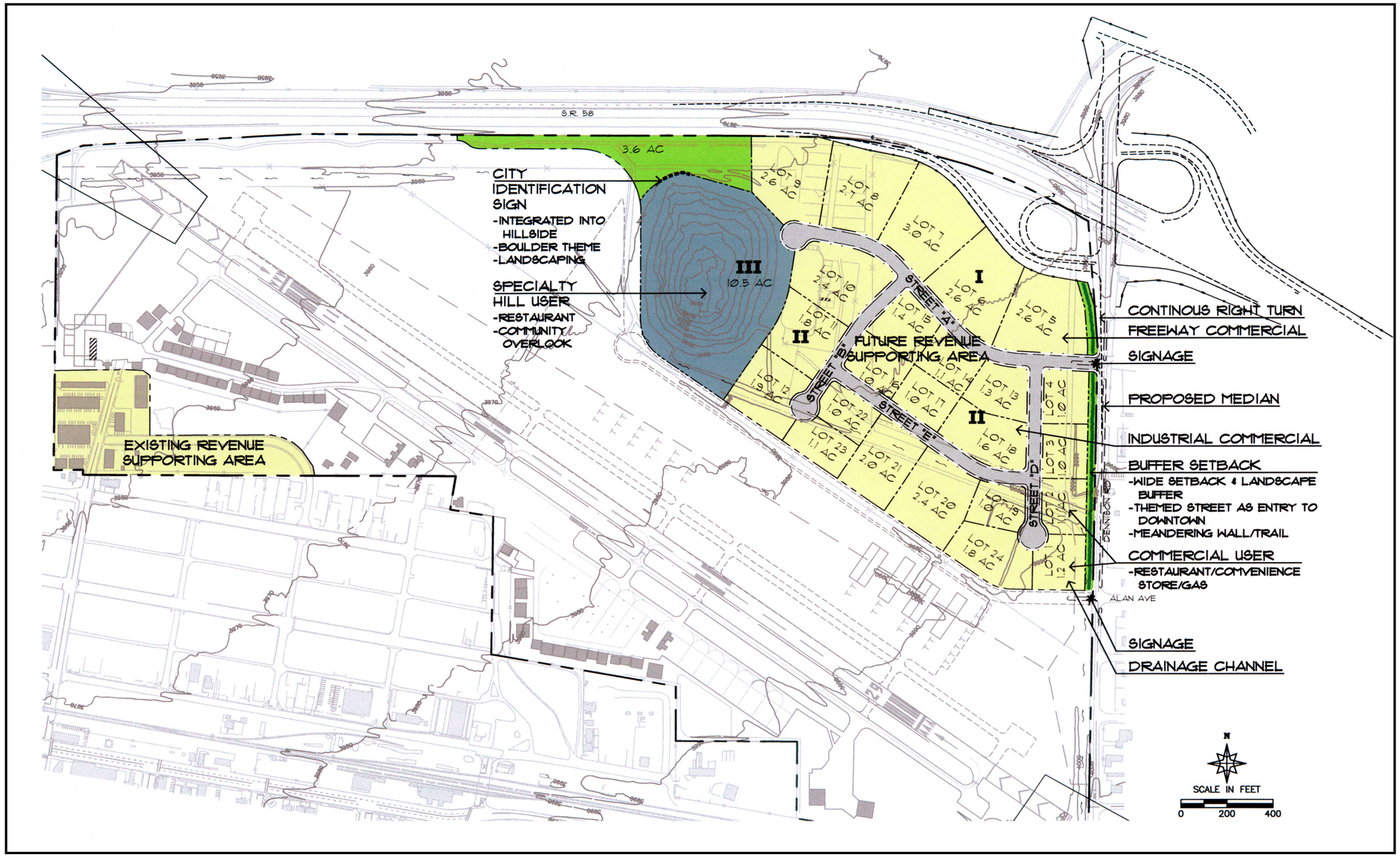


Figure 6-11
Recommended Revenue-Supporting Concept Plan, Small Lot Plan

- Initiate the mapping process for the development based on the area identified for revenue-supporting property along Dennison Road. The recording of the Subdivision Map would facilitate the ability for leasing or financing to future users. Access along the Dennison Road frontage should be restricted on the map.

- Initiate design and improvements for Dennison Road. Consistent with the Circulation Element, a 4-lane roadway with median improvements should be designed with the future intersections of Street 'A' included. Coordination will be needed with the Caltrans intersection design for both alignment and the scheduling for implementation.

- Initiation of a signage program to provide identity for the airport property and the City of Tehachapi would meet site and City goals. A larger marquee should be placed along Tehachapi Hill, facing S.R. 58 and featuring the City's logo and airport property. An additional community identity sign should be provided within the median of Dennison Road at the interchange of the freeway. Also, an entry monument sign at the access into the revenue-supporting land should be positioned to provide exposure to the land uses within the property.

- Initiate the search for various funding sources to assist in the design and development of the infrastructure, construction of Dennison Road, and improvements within the airport property.

SECTION 7
AIRPORT PLANS

SECTION 7
AIRPORT PLANS

INTRODUCTION

The Tehachapi Municipal Airport Master Plan development program is described here and illustrated in Appendix C in a set of 9 plans, which have been reduced from large-scale sheets. Sheet 1 is the Title Sheet. The overall development plan, including airside and landside improvements is shown in Sheet 2, Airport Layout Plan. The Building Area Plan, Sheet 3, and Revenue-Supporting Area Plan, Sheet 4, provide greater detail of the future airport development and revenue-supporting areas on the north side of the airport and at the west corner of the airport. Sheet 5, Part 77 Airspace Plan, and Sheet 6, Part 77 Inner Approach Surfaces, depict the imaginary surfaces on and around the airport that could potentially affect airport operations, as provided in Federal Aviation Regulations (FAR) Part 77. The Runway Protection Zone (RPZ) Plan, Sheet 7, illustrates land uses and facilities within the RPZ areas. Land uses surrounding the airport and estimated future aircraft noise contours are shown in the Off-Airport Land Use Plan, Sheet 8. Exhibit "A" (the airport property map), Sheet 9, gives the acquisition history of airport property.

The improvements depicted on these drawings are based on the selected aviation and revenue-supporting development concepts shown in Section 6. The improvements address facilities needed to satisfy projected demands of aviation activity at the airport to 2025. Further, the Airport Master Plan provides for the accommodation of aviation needs to 2050 and beyond.

AIRPORT LAYOUT PLAN

The Airport Layout Plan (ALP) is a graphic presentation of existing and planned airport improvements (see Sheet 2). It also provides valuable tabular information detailing existing and proposed facilities. The proposed development shown on the ALP conforms to FAA design standards. Airport Reference Code (ARC) B-I for airplanes with a maximum gross takeoff weight of 12,500 pounds is used as the basis for design. Specific design standards applied include:

- A future Building Restriction Line (BRL) is established at 350 feet from the relocated runway centerline on both sides of the runway (the existing BRL on the south side is 250 feet from the runway centerline). This will not require the relocation of existing buildings on

the south side, but will protect against future construction that could limit the minimums for potential instrument approach procedures. Note that the runway centerline will be relocated 12.5 feet to the north with the runway widening project because the additional 25 feet of width will be added to the north side of the runway. The 350-foot BRL will allow a building height of 14 feet at the BRL, while meeting FAR Part 77 standards for a future non-precision straight-in instrument approach procedure.

- A future parallel taxiway on the north side will have a centerline separation of 150 feet from the relocated runway centerline in accordance with FAA standards for Airport Reference Code B-I. New taxiways will be built in stages to serve the north side as it is developed over the planning period.

- A future parallel taxilane on the north side will have a centerline separation of 69 feet from the new northside taxiway in accordance with FAA standards for Airport Reference Code B-I.

- The distance from taxilane centerline to parked airplane on the north side will be 39.5 feet in accordance with FAA standards for Airport Reference Code B-I.

- Stopways will no longer be designated, but the existing stopway pavement will be retained. Although not designated as stopways, the existing stopway pavement will provide a safety margin for aircraft overruns or short landings. Standard RSAs and ROFAs, based on Airport Reference Code B-I will be provided at each end of the runway.

- The Airport Master Plan provides for the eventual relocation of the south parallel taxiway to conform to the runway-taxiway separation standard of 150 feet for Airport Reference Code B-I.

The ALP will be periodically reviewed and updated to reflect changes in airport facilities and revisions to proposed development. To receive federal funding assistance, projects must be consistent with the ALP.

Master Plan improvement projects are described below by phase of development. These improvements are proposed, but will not be constructed without the demonstration of market demand and availability of funding. In addition to the specific projects described below, efforts will be required over the course of the planning period to maintain facilities such as pavements. The extent and timing of future maintenance activities are uncertain and therefore not included in the Master Plan improvement projects.

Phase 1 (2003 to 2010)

Widen and Strengthen Runway and Relocate Displaced Threshold. A project is underway to widen and strengthen the runway. Concurrently, the Runway 29 threshold will be relocated to

375 feet from the end of the runway. Subject to determination by the FAA, the Precision Approach Path Indicator (PAPI) for Runway 29 may have to be relocated also. The project will include paving, striping and relocation of runway lights.

Prepare Hangar Sites at West Corner. Future hangar sites near the west corner of the airport will be prepared. This will include the demolition and removal of a hangar building in that area. Potential improvements could include grading and paving a small area at the end of the existing pavement.

Modify Storm Water Basin West Of Runway 11. The 2001 Tehachapi Airport Drainage Study recommends the existing storm water basin be enlarged from a capacity of 5 acre-feet to 12 acre-feet and converted to a detention basin. This project will implement that recommendation. The footprint of the modified basin will be larger. It will also be reshaped to provide the hangar sites described above. The average depth of the enlarged detention basin will be about 2.3 feet.

Resurface Taxiway and Apron Pavement. This project will provide for resurfacing all taxiway pavements and the large aircraft parking apron on the south side serving based aircraft and transient users.

Upgrade Airport Security System. A new airport security gate with controlled access will be installed at Benbow Aviation. There is no security gate at this location now, and a controlled access gate is needed to prevent unauthorized persons and vehicles from entering the airport. The two existing security gates will be upgraded with improved control systems.

Install Automated Weather Observing System (AWOS). An Automated Weather Observing System (AWOS) will be installed on the north side of the airport near the Runway 11 threshold. An AWOS contains sensors that measure, collect and disseminate weather data to help pilots with flight planning and provide them information for takeoff and landing conditions. The sensors measure weather parameters such as wind speed and direction, temperature and dew point, visibility, cloud heights and types, precipitation, and barometric pressure. AWOS siting criteria is contained in FAA Order 6560.20B, Siting Criteria for Automated Weather Observing Systems (AWOS), July 20, 1998. According to these criteria, the preferred location is 1,000 to 3,000 feet down runway from the threshold of the primary runway (Runway 29) and within 1,000 feet from the runway centerline. Constraints on the AWOS location are the need to place it at least 1,000 feet from Tehachapi Hill to avoid sheltering by the high terrain and the need to place it at least 500 feet from the runway centerline to avoid penetration of the FAR Part 77 Transitional Surface. The proposed location is 550 feet from the future runway centerline and 3,250 feet from the future Runway 29 displaced threshold. This location was chosen because it is 1,200 feet from the base of Tehachapi Hill and will not unnecessarily constrain the development of future aviation uses on the north side of the runway. The location is subject to FAA approval.

Provide Compass Calibration Pad. Compass calibration markings will be placed on the City's southeast aircraft parking apron. Before the calibration pad is marked, the location will be

checked for magnetic interference from surrounding buildings and trains on the Union Pacific Railroad tracks.

Install PAPI or PLASI on Runway 11. A Precision Approach Path Indicator (PAPI) or Pulse Light Approach Slope Indicator (PLASI) will be installed on Runway 11, in accordance with FAA Advisory Circular 150/5345-28, to provide visual approach slope guidance for that runway. Runway 29 is currently equipped with a PAPI system. The future PAPI/PLASI is located on the Airport Layout Plan based on a 3.5 degree approach slope. Before the PAPI/PLASI is installed, the appropriate approach slope (which could change the location shown) must be determined by the FAA.

Install Runway End Identifier Lights (REILs). REILs will be installed adjacent to both thresholds. REILs provide pilots with a positive delineation of the threshold location under conditions of reduced visibility.

Extend Alan Avenue West of Dennison Road for Northside Airport Access. Alan Avenue will be extended to the west of Dennison Road to provide access for northside aviation improvements. The access road will be 52 feet wide, with one lane each direction and a center turning lane. In the initial phase, the road will be approximately 560 feet long. The project will include site preparation and grading, utilities and fire protection, paving and striping, signage, street lighting, fencing modifications, and a new security gate.

Construct Partial Northside Parallel Taxiway, Run-up Apron, Connecting Taxiways, and Parallel Taxilane. A partial parallel taxiway, connecting taxiways, a run-up apron and a parallel taxilane will be constructed on the north side to serve the Phase 1 hangar development there. The project will encompass site preparation and grading, paving and striping, and medium intensity taxiway lighting (MITL).

Construct Nine Hangars on North Side of Runway. Approximately nine hangars will be constructed on the north side. The final hangar design and number will depend on a market demand assessment to be conducted before this hangar project begins. The hangar project will include site preparation and grading, utilities, paving and striping, and hangar construction.

Construct Perimeter/Service Road. A 20-foot wide, paved perimeter/service road will be constructed from the existing southeast hangar area to the future northside hangar area.

Acquire Avigation Easements for Runway Protection Zone (RPZ) Areas. The FAA recommends that fee title or avigation easements be acquired for RPZ property not owned by an airport. An allowance has been included in the capital cost estimates to acquire easements for the Runway 11 and Runway 29 RPZ property not under City control. Avigation easements will protect the RPZs from structures or land uses that don't conform to FAA standards.

Phase 2 (2011 to 2015)

Extend Northside Airport Access Road to the West. The northside access road will be extended about 816 feet to the west to serve the expanded hangar area and the future FBO site. The project will include site preparation and grading, utilities and fire protection, paving and striping, signage, street lighting, and fencing modifications.

Extend Partial Northside Parallel Taxiway and Taxilane and Construct Connecting Taxiways. The partial parallel taxiway and parallel taxilane will be extended, and additional connecting taxiways will be constructed on the north side to serve the Phase 2 hangar development and future FBO site. The project will include site preparation and grading, paving and striping, and medium intensity taxiway lighting (MITL).

Construct Eight Hangars on North Side of Runway. Approximately eight hangars will be constructed on the north side. The final hangar design and number will depend on a market demand assessment to be conducted before the hangar project begins. The hangar project will include site preparation and grading, utilities, paving and striping, and hangar construction.

Prepare FBO Site. This project will include miscellaneous site preparations, including extension of utilities.

Construct Storm Water Detention Basin North of Runway 11. The 2001 Tehachapi Airport Drainage Study recommends constructing an additional storm water detention basin north of the Runway 11 end when development of the north side of the airfield warrants it. This project would implement that recommendation, subject to the establishment of need.

Construct Drainage Improvements on the South Airport Perimeter. The 2001 Tehachapi Airport Drainage Study recommends drainage improvements on the south airport perimeter, including installation of an underground storm drain system, to improve local drainage. This project would implement that recommendation.

Provide Fire Protection for South Aircraft Parking Ramps. Fire hydrants will be installed along the south aircraft parking ramps. Approximately six hydrants will be provided. The system will be supported by an eight-inch water main, connected to existing water service in the area.

Phase 3 (2016 to 2025)

Construct Drainage Improvements Along South Parallel Taxiway. Culverts will be constructed along the south parallel taxiway in accordance with the 2001 Tehachapi Airport Drainage Study recommendations.

Relocate South Parallel Taxiway 150 Feet from Runway Centerline. The Airport Master Plan provides for the south parallel taxiway to be relocated with its centerline 150 feet from the runway centerline to meet FAA Airport Reference Code B-I standards.

Install MITL Taxiway Lights on South Parallel and Connecting Taxiways. Medium intensity taxiway lights (MITL) will be installed on the south parallel taxiway and connecting taxiways once the parallel taxiway is relocated.

Construct 17 Hangars on North Side of Runway. Approximately 17 additional hangars will be constructed on the north side. The final hangar design and number will depend on a market demand assessment to be conducted before the hangar project begins. The hangar project will include site preparation and grading, utilities, paving and striping, and hangar construction.

Extend Partial Northside Parallel Taxiway and Taxilane to West End and Construct Connecting Taxiways. The partial parallel taxiway and parallel taxilane on the north side will be extended to the Runway 11 end, and additional connecting taxiways will be constructed. A run-up area will be constructed at the west end of the parallel taxiway. The project will include site preparation and grading, paving and striping, and medium intensity taxiway lighting (MITL).

Extend Northside Airport Access Road to the West. The northside access road will be extended about 1,030 feet to the west to serve the future terminal area and aviation industrial area. The project will include site preparation and grading, utilities and fire protection, paving and striping, signage, street lighting, and fencing modifications.

Construct Airport Terminal / Administration Building, Including Transient Parking. A new terminal / administration building will be built on the north side of the runway at mid-field. Master Plan cost estimates are based on a terminal building of 2,000 square feet with 20 vehicle parking spaces. The general aviation terminal will contain a pilot and visitor lobby, a flight planning room, conference room, offices for administrative and maintenance personnel, vending machine area, and public restrooms. Approximately 18 transient spaces will be provided. The project will include site preparation and grading, utilities, tiedown paving / striping / ramp lighting, terminal building, vehicle parking paving / striping / lighting, a vehicle security gate for airport personnel, and fencing modifications. Ultimately, the terminal area could also accommodate airport maintenance, fueling, and other support facilities.

Prepare Aviation Industrial Site. This project will include miscellaneous site preparations, including extension of utilities.

AIRPORT BUILDING AREA PLAN

The Building Area Plan, Sheet 3, illustrates the proposed landside improvements in greater detail. Future landside development at Tehachapi Municipal Airport will occur primarily on the north side of the airfield, although some improvements will be made on the south side. The Building Area Plan

focuses on these building areas. The building layouts as depicted convey the general development concept and show how future requirements can be accommodated on the site. The ultimate siting of these facilities, including the number and sizes of hangars, is subject to further design investigations and tenant needs and therefore could vary from that shown in Sheet 3.

The principal features of the landside development are:

- The provision of 11 hangar sites in the southwest corner of the airport. Hangars could be constructed on these sites by the City, or the City could lease the sites for lessees to build their own hangars.

- The extension of Alan Avenue to the west to serve the airport's north side.

- The construction of a hangar complex containing T-hangars and rectangular hangars on the north side of the airfield. Thirty-four hangars are shown on the plan, which will accommodate projected demand to 2025.

- The provision of an FBO site on the north side of the airfield (5 acres).

- The development of a future terminal / administration building and airport support area on the north side (3 acres). For cost estimating purposes, a 2,000 square foot terminal with parking for 20 vehicles (7,000 square feet) is assumed. The terminal / administration building could be located approximately 450 feet from the runway centerline, where the height limit posed by FAR Part 77 is approximately 28.5 feet above the runway elevation.

- Construction of an aircraft parking ramp for 18 transient aircraft (approximately 130,000 square feet) and additional areas accommodating tiedowns for based aircraft. The transient area could accommodate more aircraft if necessary by nesting parking positions.

- The provision of an aviation industrial site on the north side of the airfield (5 acres).

Development to 2025 is shown in Sheet 3 to occur in three phases. Actual construction will be timed to be responsive to market demand and availability of funds, particularly FAA construction grants.

AIRPORT REVENUE-SUPPORTING PLAN

The Airport Revenue-Supporting Plan, Sheet 4, shows the location of the existing and future airport industrial and industrial/commercial centers. Airport property in these locations will support airport operations and development by providing additional airport revenues. A suggested "small lot" development plan is provided for the larger revenue-supporting property

bordered by State Route 58 to the north, Dennison Road to the east, and aviation development to the south and west. This site covers about 60 acres.

A request will be submitted by the City of Tehachapi to the FAA to release the existing and future revenue-supporting property shown in Sheet 4 from the agreements obligating this property for aviation purposes, in accordance with FAA Order 5190.6A, Airports Compliance Handbook, October 1, 1989.

PART 77 AIRSPACE PLAN AND PART 77 INNER APPROACH SURFACES

The dimensions of the Part 77 imaginary surfaces (Sheets 5 and 6) depend on the size of aircraft using the airport and the type of instrument approach procedures currently at the airport or expected to be in the future. To protect for a future instrument approach procedure, the FAR Part 77 criteria were applied for: (1) runways serving aircraft with maximum gross takeoff weights not exceeding 12,500 pounds, (2) a non-precision (straight-in) instrument approach procedure on Runway 29, and (3) no straight-in instrument approach procedures on Runway 11. The descriptions of the surfaces and their dimensions for Tehachapi Municipal Airport follow.

- Horizontal Surface. The horizontal surface is a horizontal plane 150 feet above the established airport elevation. The airport elevation, measured at the highest point along the runway, is 3,998 feet above mean sea level (MSL). Therefore, the elevation of the horizontal surface is 4,148 feet MSL. The perimeter of the horizontal surface is delineated by arcs with radii of 5,000 feet from the center of the ends of the runway. Adjacent arcs are connected by lines that are tangent to these arcs.

- Conical 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. The elevation of the conical surface at its outermost edge is 4,348 feet MSL.

- Primary Surfaces. The primary surface is defined as being longitudinally centered on the runway, with a width dependent on the type of runway, and extending 200 feet beyond each end of the runway. The width of the primary surface is 500 feet.

- Approach Surfaces. The slope and configuration of a runway approach surface varies as a function of the type of aircraft served and availability of instrument approach procedures. Approach surfaces terminate at the primary surface, where their width is equal to the width of the primary surface. The Runway 11 approach surface is 1,250 feet wide at its beginning point, 5,200 feet from the runway end. The approach surface for Runway 29, which allows for a future non-precision instrument approach, is 2,000 feet wide at its beginning point, 5,200 feet from the runway end.

- Transitional Surfaces. 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.

Penetrations to FAR Part 77 Surfaces

The airport imaginary surfaces shown on Sheets 5 and 6 are superimposed on United States Geological Survey (USGS) topographic maps. Review of the USGS topographic maps indicates there are terrain penetrations to the Part 77 horizontal and conical surfaces and the approach surface for Runway 11.

The following penetrations have been identified primarily from height information obtained from utility providers or measurements of approximate heights taken for this Master Plan. Object numbers given below reference Sheets 5 and 6.

Penetrations to Primary Surface

- None

Penetrations to Runway 11 Approach Surface

- Terrain at the approach end of the approach surface (approximate 32-foot penetration)

The terrain penetration will remain. The top of the hill west of Runway 11 has an obstruction light.

Penetrations to Runway 29 Approach Surface

- Dennison Road (Object 12, estimated 9-foot penetration allowing for a 15-foot vehicle on the roadway)
- Street light along Dennison Road (Object 13, estimated 19-foot penetration)
- Utility poles near Dennison Road and Tehachapi Boulevard (Objects 14, 15 and 17; estimated 24-foot to 32-foot penetrations)
- Railroad crossing arm (Object 16, estimated 17-foot penetration)
- Railroad tracks (Object 18, estimated 20-foot penetration allowing for a 23-foot train on the tracks)

These objects will remain. As described below, these objects do not penetrate the Threshold Siting Surface for the existing or future Runway 29 displaced threshold.

Penetrations to Transitional Surfaces

- Nine utility poles along Tehachapi Boulevard and Dennison Road near the Runway 29 end (Objects 2 through 10, estimated 1-foot to 24-foot penetrations). Only three of these poles penetrate the Part 77 transitional surface based on existing visual conditions, and the estimated penetrations range from one to five feet.

- Nine hangars (Objects 19 through 22 and 26 through 30, estimated penetrations from 2 to 18 feet). Only one of these hangars penetrates the Part 77 transitional surface based on existing visual conditions, and this penetration is estimated to be one foot.
- Two utility poles on the south side of the runway (Objects 23 and 25). Only one of these poles penetrates the Part 77 transitional surface based on existing visual conditions, and the estimated penetration is one foot.
- A cellular telephone tower on Tehachapi Hill (Object 31, estimated 3-foot penetration). This object does not penetrate the Part 77 transitional surface based on existing visual conditions.

Objects 19 through 31 are on airport property. All other objects penetrating Part 77 surfaces are off-airport. The objects penetrating the transitional surfaces will remain.

Penetrations to Horizontal and Conical Surfaces

- Terrain to the northwest, north, northeast, and east (see Sheet 5)

These terrain penetrations will remain. The top of the hill west of Runway 11 has an obstruction light.

Conclusions. The penetrations to FAR Part 77 surfaces described above and identified on Sheets 4 and 5 apply to Part 77 surfaces for a runway with a non-precision straight-in approach procedure. These Part 77 surfaces will protect for a future instrument approach procedure at the airport. The Part 77 penetrations based on the existing visual conditions have existed in the past and do not impact the capability to conduct visual aircraft operations safely at the airport. As described below, the Runway 29 Threshold Siting Surface has no penetrations and the Runway 11 Threshold Siting Surface is penetrated only by terrain at the far end, which is obstruction-lighted.

To control the future construction of obstacles which could affect the safe operation of aircraft at the airport and/or restrict future instrument operating procedures, it is recommended that the General Plan of the City of Tehachapi be modified to incorporate the height limitations reflected in the updated Part 77 Airspace Plan.

PENETRATIONS TO THRESHOLD SITING SURFACES

As described in Section 5, Threshold Siting Surfaces are imaginary inclined planes extending outward and upward from the ends of the runways that are used to establish the location of runway thresholds (the beginning of the portion of runway used for landing). Threshold siting standards are applied for visual conditions since there are no current instrument approach procedures at the airport. For visual runways, the Threshold Siting Surfaces extend 5,000 feet from the threshold (see Sheet 5).

Section 6 described the future relocation of the Runway 29 threshold to 375 feet from the runway end. There are currently no penetrations to the Threshold Siting Surface for Runway 29 and there will be none after the threshold is relocated.

Terrain west of the airport penetrates the Threshold Siting Surface for Runway 11 by approximately 46 feet near the approach end of the surface. There is an obstruction light at the top of the penetrating hill. This deviation from FAA standards is proposed to remain.

RUNWAY PROTECTION ZONE PLAN

The Runway Protection Zone Plan, Sheet 7, shows land uses within the Runway Protection Zones (RPZs). Both RPZs are 1,000 feet long, have an inner width of 250 feet, have an outer width of 450 feet, and contain approximately 8.0 acres. These RPZ dimensions are the same for the existing visual runway conditions and runways having instrument approaches with visibility minimums not lower than one mile.

RPZs should be kept free of all objects that are obstructions to air navigation. While it is desirable to clear all objects from the RPZ, some uses are permitted. Land uses not recommended for RPZs are residences and places of public assembly. Churches, schools, hospitals, office buildings, shopping centers, and other uses with similar concentrations of people typify places of public assembly. Fuel storage facilities should not be located in the RPZ.

Runway 11 RPZ

The RPZ for Runway 11 encompasses airport property closest to the runway, the State Route 58 corridor, and small areas planned for industrial use. The existing and planned land uses in this RPZ are compatible with the airport according to FAA standards.

Runway 29 RPZ

The RPZ for Runway 29 encompasses airport property closest to the runway, roadway and railroad corridors, and property planned for industrial uses. The existing and planned land uses in this RPZ are compatible with the airport according to FAA standards.

While the land uses in the RPZs conform to FAA standards, not all the RPZ property is controlled by the City. The Airport Master Plan provides for the acquisition of avigation easements by the City for RPZ areas not now controlled by the City or in transportation corridors. Avigation easements typically prevent land uses that do not conform to FAA standards and that exceed height limitations. Easement rights would be purchased by the City from property owners willing to sell them.

OFF-AIRPORT LAND USE PLAN

The Off-Airport Land Use Plan, Sheet 8, depicts airport noise and safety areas against the background of General Plan land uses in the airport vicinity. Land uses are taken from the Tehachapi General Plan Update, Land Use Element, adopted August 19, 1996.

Airport noise contours were taken from the Tehachapi General Plan Update, Noise Element, adopted October 18, 1999 and represent noise levels for approximately the same number of operations as forecast in this Master Plan for 2025. This document reports that no homes are within this future 65 dBA (decibel) CNEL noise contour. The 65 CNEL noise contour appears to encompass a portion of a residential property on the southwest side of the airport, but does not encompass the house on this property.

Sheet 8 also shows the locations of four avigation easements around the airport. The easement on the northeast corner of Tehachapi Boulevard and Dennison Road covers a portion of the Runway 29 RPZ. These avigation easements generally require the property owner (grantor of the easement) to restrict building heights, trim trees, mark and light obstructions and give the City of Tehachapi rights for unobstructed flights over the property.

EXHIBIT "A" (AIRPORT PROPERTY MAP)

The Exhibit "A" (Airport Property Map), Sheet 9, identifies each parcel of airport property and indicates how each was acquired. The Airport Master Plan provides for the City to obtain avigation easements for property in the RPZs not currently under City control.

SECTION 8
FINANCIAL PLAN

SECTION 8
FINANCIAL PLAN

INTRODUCTION

This section contains a financial plan that supports the implementation of the Tehachapi Municipal Airport Master Plan capital improvements. It identifies the estimated capital costs and timing of the proposed development, and describes the financing plan to implement the planned improvements. It addresses the development of the revenue-supporting areas as well as the aviation improvements.

CAPITAL COST ESTIMATES AND PHASING

Table 8-1 presents the estimated capital improvement costs and phasing of the Airport Master Plan development, described in Section 7. Costs are shown in 2003 dollars. All construction costs include 25 percent for engineering studies, surveys, design, and construction administration as well as an allowance of 20 percent for contingencies.

Aviation development costs are shown for three phases of development: Phase 1 (2003 – 2010), Phase 2 (2011 – 2015), and Phase 3 (2016 – 2025). Although airport improvements are planned according to these phases, development at the airport will not occur unless needed to accommodate aviation demand. Construction could happen earlier or later than estimated here, depending on future needs and the availability of FAA grants and other sources of funding.

The following conditions and assumptions apply to the cost estimates:

- Apron pavement is 4 inches of asphalt concrete pavement over 10 inches of crushed aggregate base.
- Taxiway pavement is 5 inches of asphalt concrete pavement over 16 inches of crushed aggregate base.
- Roadway extension of Alan Avenue is 4 inches of asphalt concrete pavement over 12 inches of crushed aggregate base.

Table 8-1
Schedule of Master Plan Improvements and Estimated Costs
Tehachapi Municipal Airport [a]

Project	Quantity [b]		Unit Cost [c]	Estimated Cost	Schedule
Phase 1 Improvements (2003-2010)					
1. Widen and strengthen runway and relocate displaced threshold	[d]			$1,054,000	2003
2. Prepare hangar sites at southwest corner for lease-(building demolition & pavement patch)	3,580	SF	$22	$79,000	2003-4
3. Modify storm water basin southwest of Runway 11 (see 2001 Drainage Study)	1	LS	$78,000	$78,000	2003-4
4. Resurface taxiway and apron pavement	[d]			$350,000	2003-5
5. Provide airport security system improvements (3 gates with new access system)	3	EA	$30,000	$90,000	2004
6. Install Automated Weather Observing System (AWOS)	1	EA	$150,000	$150,000	2004
7. Provide compass calibration pad and supplemental wind cone for Runway 29					2004
a. Compass calibration markings	1	EA	$3,000	$3,000	
b. Supplemental wind cone	1	EA	$5,000	$5,000	
Total project				$8,000	
8. Install PAPI/PLASI on Runway 11	1	EA	$65,000	$65,000	2004-5
9. Install REILs on Runways 11 and 29	2	EA	$12,000	$24,000	2004-5
10. Extend Alan Avenue west of Dennison Road for northside airport access					2005-6
a. Site preparation / grading	41,470	SF	$0.70	$29,000	
b. Utilities / fire protection	1	LS	$146,000	$146,000	
c. Paving / striping	560	LF	$250	$140,000	
d. Signage	1	LS	$2,000	$2,000	
e. Lighting	1	LS	$16,000	$16,000	
f. Fencing / security gate modifications	1	LS	$50,000	$50,000	
Total project				$383,000	

Table 8-1 (Continued)
Schedule of Master Plan Improvements and Estimated Costs
Tehachapi Municipal Airport [a]

Project	Quantity [b]		Unit Cost [c]	Estimated Cost	Schedule
11. Construct partial northside parallel taxiway, runup apron, connecting taxiways, and parallel taxilane					2005-6
a. Site preparation / grading	46,670	SF	$0.70	$33,000	
b. Paving / striping	46,670	SF	$5	$233,000	
c. Drainage	700	LF	$70	$49,000	
d. MITL taxiway lighting	1,400	LF	$64	$90,000	
Total project				$405,000	
12. Construct 9 hangars on north side of runway					2006-7
a. Site preparation / grading	71,010	SF	$0.40	$28,000	
b. Utilities	100	LF	$90	$9,000	
c. Tiedown apron paving / striping	44,016	SF	$3	$132,000	
d. Hangar taxilane paving / striping	14,820	SF	$3	$44,000	
e. Hangar construction	10,710	SF	$20	$214,000	
Total project				$427,000	
13. Construct Service Road (20-feet wide)	2,140	LF	$60	$128,000	2006-7
14. Acquire avigation easements for runway protection zone (RPZ) areas	1	LS	$13,000	$13,000	2008-9
Subtotal Phase 1				$3,254,000	
Phase 2 Improvements (2011-2015)					
15. Extend northside airport access road to the west (Alan Avenue)					
a. Site preparation / grading	816	LF	$71	$58,000	
b. Utilities / fire protection	816	LF	$150	$122,000	
c. Paving / striping	816	LF	$250	$204,000	
d. Signage	816	LF	$6	$5,000	
e. Lighting	816	LF	$30	$24,000	
f. Fencing	854	LF	$40	$34,000	
g. Sanitary Sewer (to sewer along freeway)	1,900	LF	$60	$114,000	
Total project				$561,000	

Table 8-1 (Continued)
Schedule of Master Plan Improvements and Estimated Costs
Tehachapi Municipal Airport [a]

Project	Quantity [b]		Unit Cost [c]	Estimated Cost	Schedule
16. Extend partial northside parallel taxiway and taxilane and construct connecting taxiways					
a. Site preparation / grading	65,822	SF	$0.70	$46,000	
b. Paving / striping	65,822	SF	$5	$329,000	
c. Drainage	900	LF	$80	$72,000	
d. MITL taxiway lighting	1,700	LF	$64	$109,000	
Total project				$556,000	
17. Construct 8 hangars on north side of runway					
a. Site preparation / grading	55,632	SF	$0.40	$22,000	
b. Utilities	100	LF	$90	$9,000	
c. Tiedown apron paving / striping	14,616	SF	$3	$44,000	
d. Hangar taxilane paving / striping	15,120	SF	$3	$45,000	
e. Hangar construction	11,088	SF	$20	$222,000	
Total project				$342,000	
18. Prepare FBO site for lease					
a. Site preparation	233,422	SF	$0.05	$12,000	
b. Utilities	80	LF	$120	$10,000	
Total project				$22,000	
19. Construct storm water detention basin north of Runway 11 (see 2001 Drainage Study)	1	LS	$111,000	$111,000	
20. Construct Drainage Improvements on the south airport perimeter (see 2001 Drainage Study)	1	LS	$372,000	$372,000	
21. Provide fire protection for aircraft parking aprons on south side	1	LS	$190,000	$190,000	
Subtotal Phase 2				$2,154,000	
Phase 3 Improvements (2016-2025)					
22. Construct drainage improvements on the south parallel taxiway (see 2001 Drainage Study)	1	LS	$277,000	$277,000	
23. Relocate south parallel taxiway 150 feet from runway centerline	43,665	SF	$6	$262,000	

Table 8-1 (Continued)
Schedule of Master Plan Improvements and Estimated Costs
Tehachapi Municipal Airport [a]

Project	Quantity [b]		Unit Cost [c]	Estimated Cost	Schedule
24. Install MITL taxiway lights on south parallel and connecting taxiways	4,200	LF	$64	$269,000	
25. Construct 17 hangars on north side of runway					
a. Site preparation / grading	101,017	SF	$0.40	$40,000	
b. Utilities	100	LF	$90	$9,000	
c. Tiedown apron paving / striping	27,492	SF	$3	$82,000	
d. Hangar taxilane paving / striping	26,400	SF	$3	$79,000	
e. Hangar construction	21,798	SF	$20	$436,000	
Total project				$646,000	
26. Extend partial northside parallel taxiway and taxilane to west end and construct connecting taxiways					
a. Site preparation / grading	130,837	SF	$0.70	$92,000	
b. Paving / striping	130,837	SF	$5	$654,000	
c. Drainage	2,800	LF	$90	$252,000	
d. MITL taxiway lighting	3,400	LF	$64	$218,000	
Total project				$1,216,000	
27. Extend northside airport access road to the west					
a. Site preparation / grading	1,030	LF	$71	$73,000	
b. Utilities	1,030	LF	$150	$155,000	
c. Paving / striping	1,030	LF	$174	$179,000	
d. Signage	1,030	LF	$6	$6,000	
e. Lighting	1,030	LF	$30	$31,000	
f. Drainage (graded drainage ditch)	500	LF	$30	$15,000	
g. Fencing / security gate modifications	2,250	LF	$22	$50,000	
Total project				$509,000	
28. Construct airport terminal / administration building, including transient parking					
a. Site preparation / grading	265,180	SF	$0.40	$106,000	
b. Utilities	200	LF	$120	$24,000	
c. Tiedown paving / striping / lighting	109,200	SF	$3.00	$328,000	
d. Terminal building - Furnished	2,000	SF	$130	$260,000	
e. Vehicle parking paving / striping / lighting	7,000	SF	$3.00	$21,000	
f. Fencing / security gate modifications	1	LS	$20,400	$20,000	
Total project				$759,000	

Table 8-1 (Continued)
Schedule of Master Plan Improvements and Estimated Costs
Tehachapi Municipal Airport [a]

Project	Quantity [b]	Unit Cost [c]	Estimated Cost	Schedule
29. Prepare aviation industrial site for lease				
a. Site preparation	229,345 SF	$0.05	$11,000	
b. Utilities	80 LF	$120	$10,000	
Total project			$21,000	
Subtotal Phase 3			$3,959,000	
Total Master Plan Improvements				
Total of all Master Plan improvements			$9,367,000	

[a] Estimated by DMJM Aviation.
[b] SF = square feet; EA = each; LF = linear feet; AC = acres; LS=lump sum.
[c] Includes design and construction management services and an allowance for contingencies.
[d] Existing project cost provided by City of Tehachapi.

- Hangar construction costs are $6 per square foot for the foundation, $12 per square foot for the building, and $2 per square foot for all other building costs including engineering and electrical service, totaling $20 per square foot.

- Costs of new hangars on the north side are based on the following dimensions:

  - T-hangars: a clear door width of 41.5 feet, a depth of 33.0 feet, a wing depth of 18.0 feet, and a tail width of 21.0 feet.

  - Rectangular hangars: a clear door width of 41.5 feet and a depth of 33.0 feet.

  The Building Area Plan provides space for larger hangars in the event larger hangars are desired.

- The mix of new hangars on the north side is: 9 T-hangars in Phase 1, 8 rectangular hangars in Phase 2, and 9 T-hangars and 8 rectangular hangars in Phase 3.

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 loans, private capital, airport revenues, and City funds.

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 most recently by the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century of 2000. The AIP provides funding 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, a $.12 and $.14 per gallon tax on general aviation gasoline and jet fuel, respectively, and a $.05 and $.10 per pound tax on tires and tubes, 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 2003, which ends on September 30, 2003. Reauthorization will be necessary for funding after 2003.

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, some utilities, navigational aids, and aviation-related weather reporting equipment and safety equipment; 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 art work, or routine maintenance and repair. Technical advisory services are also provided.

The Airport Improvement Program provides a maximum federal share of 90 percent for all eligible projects at Tehachapi Airport. Because of the large number of projects competing for AIP funds, not all eligible projects can be funded.

The funds for AIP are distributed in accordance with provisions contained in the 1982 Act.

California Aid to Airports Program (CAAP)

The CAAP provides three types of grant funding: annual grants, acquisition and development grants (A&D), and a portion of the non-federal portion of FAA AIP grants (AIP Match).

The annual grants are used to fund pre-approved, eligible projects and/or operations and maintenance of public-use general aviation airports (commercial service and reliever airports are not eligible). The funds are a fixed amount of $10,000 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 tie downs, 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. They may also be used as the local match for a federal grant.

Acquisition and development grants provide discretionary funds for airport projects included in the adopted State Capital Improvement Program (CIP). The CIP is an element of the California Aviation System Plan (CASP). Inclusion in the CIP is a prerequisite for a project being considered for either an A&D grant or an AIP matching grant, and projects are selected for A&D grants from the CIP. In prioritizing project submittals, the Aeronautics Program 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. Funds cannot be used for operations or general maintenance. Grants range from $10,000 to $500,000.

The California Transportation Commission annually established 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.

A third type of grant became effective October 1, 1994 and relates to AIP projects funded after this date. As explained previously, FAA AIP grants will typically cover 90 percent of eligible project costs for general aviation airports, which prior to October 1, 1994 left 10 percent of the project costs to be borne by the airport sponsor. These state grants will provide five percent of the FAA grant to

be used as part of the sponsor's matching share. This translates into 4.5 percent of typical project costs, which reduces the sponsor's matching share to 5.5 percent.

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 sponsor's share (5.5 percent) of project costs required to match a federal grant. Requests for matching fund loans are given highest priority.

Private Capital

Private funding is often available for certain airport improvements, including FBO site development, aviation industrial site development, and aircraft hangar construction.

Airport Revenues and City Funds

The airport generates revenue through leases, administrative and miscellaneous (mainly special events, fuel sales and hangar fees) sources. However, based on five years of airport financial information, the airport does not generate a net operating revenue surplus (operating revenue minus operating cost). It is assumed in this analysis that no net revenues from existing airport operations will be available to fund future airport development projects.

However, several potential airport revenue enhancements may provide additional revenues that could be used to fund future airport development. These potential revenue enhancements include:

- Lease of airport revenue-supporting property. The recommended Airport Master Plan includes development of a portion of the northeast corner of the airport as revenue supporting uses. The Plan identifies approximately 53 acres of developable property. Assuming the airport ground-leased the property and that the site developer provided private capital to improve and market the property, the airport could potentially receive between $20,000 and $120,000 per year in lease revenues from this site, as shown in Table 8-2.

  These estimates are preliminary and actual revenues would be dependent on the absorption of the leasable property and the actual ground-lease rate realized from the agreements. The

marketability of the property, timing of leasing, as well as the actual ground lease rates need to be identified through future market and financial feasibility analyses.

Table 8-2
Preliminary Estimate of Potential Revenue from Ground Lease of Unimproved Airport Revenue-Supporting Property (2003 dollars)

Area	Net Leasable Acres	Annual Lease Rate/Acre From	-	To	Annual Lease Revenue From	-	To
Area I	15.2	$400	-	$2,200	$6,080	-	$33,440
Area II	35.7	$400	-	$2,200	14,280	-	78,540
Area III [a]	2.0	$400	-	$2,200	800	-	4,400
Total	52.9				$21,160	-	$116,380

[a] Area III includes 10 acres of mostly hilly property. It is assumed that an equivalent of 2 net acres is usable and leasable.
Source: DMJM Aviation.

- Adjustment to aviation ground lease rates and terms. Current ground lease rates and terms at the Airport are as follows: base rate of $0.03904 per square foot; annual escalations based on the Consumer Price Index (CPI); and a 20-year term with up to two 5-year extensions. Lessee improvements to the property do not revert to the airport at the end of the lease. Based on the survey of leasing practices at other comparable airport contained in Appendix D, the base lease rate, term and annual escalation clauses appear reasonable. Two potential changes could be made to the lease agreements that would potentially increase airport revenue and asset value are:

  – The annual CPI adjustment effectively increases lease rates at the rate of general inflation. Historically land value has generally increased at a greater rate than inflation (CPI). In addition to the annual CPI adjustment, airport ground lease

agreements might include a periodic adjustment to the lease rate based on the appraised fair market value. This might occur every five years and would ensure that the ground lease rates accurately reflect the value of the land.

– Include a reversionary clause specifying that tenant improvements revert to the Airport at the end of the lease period.

Finally, the City of Tehachapi may fund some capital improvements.

PROJECT COST SHARES

Project cost shares were allocated among federal, state and local sources under the following assumptions and criteria: (1) all FAA AIP eligible projects will be funded at their maximum eligible level (generally 90 percent of project costs); (2) CAAP Matching Grants will be used to fund the maximum five percent share of FAA AIP grants; (3) the balance of project costs were assigned to local responsibility.

At the local level, project cost shares were further allocated among three funding sources: loans; private capital; and City/airport contributions. Loans (either through the CAAP Loan Program or some other source) were assumed to be used to fund a portion of future hangar development (Projects 12, 17, and 25). Eligible loan amounts were based on the use of hangar rents for loan repayment, a potential repayment stream of 90 percent of hangar rental revenue and typical loan terms and current interest rates offered by the CAAP Loan Program (see Table E-1 in Appendix E). Private capital was assumed to be used for the improvement of hangar sites (Project 2) and preparation of the aviation industrial site (Project 29). The balance of project costs was assumed to be funded through City/airport contributions.

Summary of Funding Program

The schedule of Master Plan improvement costs (in constant 2003 dollars) by phase and source under these assumptions and criteria are summarized in Table 8-3. In summary, the $9.4 million, in constant 2003 dollars, Master Plan capital improvement program is anticipated to be funded by FAA AIP grants ($6.7 million – 71 percent of the total); State CAAP grants ($334,000 – 4 percent of the total); loans ($785,000 – 8 percent of the total); private capital ($122,000 – 1 percent of the total); and City/airport contributions ($1.5 million – 16 percent of the total). Detailed allocations of project costs by funding source are shown in Tables 8-4 and 8-5.

Hangar Development Sensitivity Analysis

Several issues may affect the amount of hangar development costs that could be funded through loans. As noted in the previous section, the loan amounts included in the funding program were based on the use of hangar rents for loan repayment, a potential repayment stream of 90 percent of

hangar rental revenue and typical loan terms and current interest rates offered by the CAAP Loan Program. Potential hangar rents were estimated from a survey of hangar rents at comparable airports (see Appendix D), to be $180 per month for T-hangars and $250 per month for rectangular hangars (in constant 2003 dollars).

Table 8-3
Summary of Capital Improvement Program Funding
By Phase and Source

	Cost (in millions)				
Source	**Phase 1**	**Phase 2**	**Phase 3**	**Total**	**% of Total**
Federal Grants	$2,476.0	$1,545.9	$2,632.3	$6,654.2	71.0%
State Grants	125.1	77.3	131.6	334.1	3.6%
Local					
Loans	180.0	225.0	380.0	785.0	8.4%
Private Capital	79.0	22.0	21.0	122.0	1.3%
City/Airport Contributions	393.9	283.8	794.1	1,471.7	15.7%
Total	$3,254.0	$2,154.0	$3,959.0	$9,367.0	100.0%

Source: DMJM Aviation.

Sensitivity analyses were undertaken to evaluate: (1) the minimum monthly rent needed to fully fund the local share of the hangar development program through loans to be repaid from hangar rents; and (2) the potential effect of future increases in hangar rents on the amount of supportable loans.

Regarding the first issue, monthly rents for 9 T-hangars in Phase 1 would need to average $280 to produce a revenue stream to support a loan to fully fund the local share of this project (see Table E-2 in Appendix E). Monthly rents for 8 rectangular hangars in Phase 2 would need to average $325 to produce a revenue stream to support a loan to fully fund the local share of this project. Monthly rents for 9 T-hangars in Phase 3 would need to average $285 and $330 for the 8 rectangular hangars to produce a revenue stream to support a loan to fully fund the local share of this project.

Table 8-4
Schedule of Master Plan Improvement Costs and Funding Sources
Tehachapi Municipal Airport [a]

Project	Estimated Cost	Schedule	Funding by Source		
			Federal	State	Local
Phase 1 Improvements (2003-2010)					
1. Widen and strengthen runway and relocate displaced threshold	$1,054,000	2003	948,600	48,781	56,619
2. Prepare hangar sites at southwest corner for lease- (Building Demolition & Pavement Patch)	$79,000	2003-4	-	-	79,000
3. Modify storm water basin southwest of Runway 11- (See 2001 Drainage Study)	$78,000	2003-4	70,200	3,510	4,290
4. Resurface taxiway and apron pavement	$350,000	2003-5	315,000	15,750	19,250
5. Airport Security System Improvements (3 gates with new access system)	$90,000	2004	81,000	4,050	4,950
6. Install Automated Weather Observing System (AWOS)	$150,000	2004	135,000	6,750	8,250
7. Provide compass calibration pad and supplemental wind cone for Runway 29		2004			
a. Compass calibration markings	$3,000		2,700	135	165
b. Supplemental wind cone	$5,000		4,500	225	275
Total project	$8,000		7,200	360	440
8. Install PAPI/PLASI on Runway 11	$65,000	2004-5	58,500	2,925	3,575
9. Install REILs on Runways 11 and 29	$24,000	2004-5	21,600	1,080	1,320
10. Extend Alan Avenue west of Dennison Road for northside airport access		2005-6			
a. Site preparation / grading	$29,000		26,100	1,305	1,595
b. Utilities / fire protection	$146,000			-	146,000
c. Paving / striping	$140,000		126,000	6,300	7,700
d. Signage	$2,000		1,800	90	110
e. Lighting	$16,000		14,400	720	880
f. Fencing / security gate modifications	$50,000		45,000	2,250	2,750
Total project	$383,000		213,300	10,665	159,035
11. Construct partial northside parallel taxiway, runup apron, connecting taxiways, and parallel taxilane		2005-6			
a. Site preparation / grading	$33,000				
b. Paving / striping	$233,000				
c. Drainage	$49,000				
d. MITL taxiway lighting	$90,000				
Total project	$405,000		364,500	18,225	22,275

Table 8-4 (Continued)
Schedule of Master Plan Improvement Costs and Funding Sources
Tehachapi Municipal Airport [a]

Project	Estimated Cost	Schedule	Funding by Source		
			Federal	State	Local
12. Construct 9 hangars on north side of runway		2006-7			
a. Site preparation / grading	$28,000		15,372	769	11,859
b. Utilities	$9,000			-	9,000
c. Tiedown apron paving / striping	$132,000		118,800	5,940	7,260
d. Hangar taxilane paving / striping	$44,000				44,000
e. Hangar construction	$214,000				214,000
Total project	$427,000		134,172	6,709	286,119
13. Construct Service Road- 20-feet wide	$128,000	2006-7	115,200	5,760	7,040
14. Acquire avigation easements for runway protection zone (RPZ) areas	$13,000	2008-9	11,700	585	715
Subtotal Phase 1	$3,254,000		$2,475,972	$125,150	$652,878
Phase 2 Improvements (2011-2015)					
15. Extend northside airport access road to the west (Alan Avenue)					
a. Site preparation / grading	$58,000		52,200	2,610	3,190
b. Utilities / fire protection	$122,000			-	122,000
c. Paving / striping	$204,000		183,600	9,180	11,220
d. Signage	$5,000		4,500	225	275
e. Lighting	$24,000		21,600	1,080	1,320
f. Fencing	$34,000		30,600	1,530	1,870
g. Sanitary Sewer (to sewer along freeway)	$114,000		102,600	5,130	6,270
Total project	$561,000		395,100	19,755	146,145
16. Extend partial northside parallel taxiway and taxilane and construct connecting taxiways					
a. Site preparation / grading	$46,000				
b. Paving / striping	$329,000				
c. Drainage	$72,000				
d. MITL taxiway lighting	$109,000				
Total project	$556,000		500,400	25,020	30,580
17. Construct 8 hangars on north side of runway					
a. Site preparation / grading	$22,000		5,148	257	16,595
b. Utilities	$9,000			-	9,000
c. Tiedown apron paving / striping	$44,000		39,600	1,980	2,420
d. Hangar taxilane paving / striping	$45,000				45,000
e. Hangar construction	$222,000				222,000
Total project	$342,000		44,748	2,237	295,015

Table 8-4 (Continued)
Schedule of Master Plan Improvement Costs and Funding Sources
Tehachapi Municipal Airport [a]

Project	Estimated Cost	Schedule	Funding by Source		
			Federal	State	Local
18. Prepare FBO site for lease					
a. Site preparation	$12,000				
b. Utilities	$10,000				
Total project	$22,000		-	-	22,000
19. Construct storm water detention basin north of Runway 11- (See Drainage Study)	$111,000		99,900	4,995	6,105
20. Construct Drainage Improvements on the south airport perimeter (See 2001 Drainage Study)	$372,000		334,800	16,740	20,460
21. Fire protection for south aprons.	$190,000		171,000	8,550	10,450
Subtotal Phase 2	$2,154,000		$1,545,948	$77,297	$530,755
Phase 3 Improvements (2016-2025)					
22. Construct drainage improvements on the south parallel taxiway- (See Drainage Study)	$277,000		249,300	12,465	15,235
23. Relocate south parallel taxiway 150 feet from runway centerline	$262,000		235,800	11,790	14,410
24. Install MITL taxiway lights on south parallel and connecting taxiways	$269,000		242,100	12,105	14,795
25. Construct 17 hangars on north side of runway					
a. Site preparation / grading	$40,000		9,720	486	29,794
b. Utilities	$9,000			-	9,000
c. Tiedown apron paving / striping	$82,000		73,800	3,690	4,510
d. Hangar taxilane paving / striping	$79,000				79,000
e. Hangar construction	$436,000				436,000
Total project	$646,000		83,520	4,176	558,304
26. Extend partial northside parallel taxiway and taxilane to west end and construct connecting taxiways					
a. Site preparation / grading	$92,000				
b. Paving / striping	$654,000				
c. Drainage	$252,000				
c. MITL taxiway lighting	$218,000				
Total project	$1,216,000		1,094,400	54,720	66,880

Table 8-4 (Continued)
Schedule of Master Plan Improvement Costs and Funding Sources
Tehachapi Municipal Airport [a]

Project	Estimated Cost	Schedule	Funding by Source		
			Federal	State	Local
27. Extend northside airport access road to the west					
a. Site preparation / grading	$73,000		65,700	3,285	4,015
b. Utilities	$155,000			-	155,000
c. Paving / striping	$179,000		161,100	8,055	9,845
d. Signage	$6,000		5,400	270	330
e. Lighting	$31,000		27,900	1,395	1,705
f. Drainage	$15,000		13,500	675	825
g. Fencing / security gate modifications	$50,000		45,000	2,250	2,750
Total project	$509,000		318,600	15,930	174,470
28. Construct airport terminal / administration building, including transient parking					
a. Site preparation / grading	$106,000		95,400	4,770	5,830
b. Utilities	$24,000			-	24,000
c. Tiedown paving / striping / lighting	$328,000		295,200	14,760	18,040
d. Terminal building - Furnished	$260,000			-	260,000
e. Vehicle parking paving / striping / lighting	$21,000			-	21,000
f. Fencing / security gate modifications	$20,000		18,000	900	1,100
Total project	$759,000		408,600	20,430	329,970
29. Prepare aviation industrial site for lease					
a. Site preparation	$11,000				
b. Utilities	$10,000				
Total project	$21,000		-	-	21,000
Subtotal Phase 3	$3,959,000		$2,632,320	$131,616	$1,195,064
Total Master Plan Improvements					
Total of all Master Plan improvements	$9,367,000		$6,654,240	$334,063	$2,378,697

[a] Estimated by DMJM Aviation.

Regarding the second issue, while Caltrans Division of Aeronautics will consider inflation when evaluating project feasibility for loans, the Division typically prefers projects to show economic feasibility assuming no inflation in rental income. The Division currently estimates annual inflation rates to be one percent to three percent per year, if inflation in rents is considered. For purposes of this sensitivity analysis, an annual inflation rate of two percent per year was applied to the market based rents shown in the funding program.

Table 8-5
Schedule of Local Share of Master Plan Improvement Costs and Potential Funding Sources
Tehachapi Municipal Airport [a]

Project	Local Share of Project Cost	Schedule	Funding by Source		
			Loan	Private	City/ Airport
Phase 1 Improvements (2003-2010)					
1. Widen and strengthen runway and relocate displaced threshold	$56,619	2003	-	-	56,619
2. Prepare hangar sites at southwest corner for lease- (Building Demolition & Pavement Patch)	$79,000	2003-4	-	79,000	-
3. Modify storm water basin southwest of Runway 11- (See 2001 Drainage Study)	$4,290	2003-4		-	4,290
4. Resurface taxiway and apron pavement	$19,250	2003-5			19,250
5. Airport Security System Improvements (3 gates with new access system)	$4,950	2004		-	4,950
6. Install Automated Weather Observing System (AWOS)	$8,250	2004			8,250
7. Provide compass calibration pad and supplemental wind cone for Runway 29	$440	2004	-	-	440
8. Install PAPI/PLASI on Runway 11	$3,575	2004-5	-	-	3,575
9. Install REILs on Runways 11 and 29	$1,320	2004-5	-	-	1,320
10. Extend Alan Avenue west of Dennison Road for northside airport access	$159,035	2005-6	-	-	159,035
11. Construct partial northside parallel taxiway, runup apron, connecting taxiways, and parallel taxilane	$22,275	2005-6	-	-	22,275
12. Construct 9 hangars on north side of runway	$286,119	2006-7	180,000	-	106,119
13. Construct Service Road- 20-feet wide	$7,040	2006-7	-	-	7,040
14. Acquire avigation easements for runway protection zone (RPZ) areas	$715	2008-9	-	-	715
Subtotal Phase 1	$652,878		$180,000	$79,000	$393,878
Phase 2 Improvements (2011-2015)					
15. Extend northside airport access road to the west (Alan Avenue)	$146,145		-	-	146,145
16. Extend partial northside parallel taxiway and taxilane and construct connecting taxiways	$30,580		-	-	30,580

Table 8-5 (Continued)
Schedule of Local Share of Master Plan Improvement Costs and Potential Funding Sources
Tehachapi Municipal Airport [a]

Project	Local Share of Project Cost	Schedule	Funding by Source		
			Loan	Private	City/ Airport
17. Construct 8 hangars on north side of runway	$295,015		225,000	-	70,015
18. Prepare FBO site for lease	$22,000		-	22,000	-
19. Construct storm water detention basin north of Runway 11- (See Drainage Study)	$6,105		-	-	6,105
20. Construct Drainage Improvements on the south airport perimeter (See 2001 Drainage Study)	$20,460		-	-	20,460
21. Fire protection for south aprons.	$10,450		-	-	10,450
Subtotal Phase 2	$530,755		$225,000	$22,000	$283,755
Phase 3 Improvements (2016-2025)					
22. Construct drainage improvements on the south parallel taxiway- (See Drainage Study)	$15,235		-	-	15,235
23. Relocate south parallel taxiway 150 feet from runway centerline	$14,410		-	-	14,410
24. Install MITL taxiway lights on south parallel and connecting taxiways	$14,795		-	-	14,795
25. Construct 17 hangars on north side of runway	$558,304		380,000	-	178,304
26. Extend partial northside parallel taxiway and taxilane to west end and construct connecting taxiways	$66,880		-	-	66,880
27. Extend northside airport access road to the west	$174,470		-	-	174,470
28. Construct airport terminal / administration building, including transient parking	$329,970		-	-	329,970
29. Prepare aviation industrial site for lease	$21,000		-	21,000	-
Subtotal Phase 3	$1,195,064		$380,000	$21,000	$794,064
Total Master Plan Improvements					
Total of all Master Plan improvements	$2,378,697		$785,000	$122,000	$1,471,697

[a] Estimated by DMJM Aviation.

Phase 1 hangar development was assumed to occur in 2005 with occupancy in 2006. Phase 2 hangar development was assumed to occur in 2012 with occupancy in 2013. Phase 3 hangar development was assumed to occur in 2018 with occupancy in 2019. Inflated monthly rents for T-hangars and rectangular hangars, respectively, in the first year of occupancy would be $191 and $265 in 2006, $219 and $305 in 2013, and $247 and $343 in 2019. Current Caltrans CAAP loan terms were used (5.05 percent annual interest and a 15-year term).

Under this scenario, the amount of supportable loan for Phase 1 hangar development costs (in constant 2003 dollars) could increase by $30,000 to $35,000, Phase 2 by $35,000 to $40,000, and Phase 3 by $60,000 to $65,000. Overall, if hangar rent inflation is assumed, the local share of hangar development costs funded by loans could potentially increase by $130,000 to $155,000, reducing the local share funded by City/Airport contributions by that amount.

SECTION 9
ENVIRONMENTAL EVALUATION

SECTION 9
ENVIRONMENTAL EVALUATION

INTRODUCTION

This environmental constraints analysis is based on the recommended improvements and the aviation activity forecasts presented in Sections 4 and 7 of this report. This analysis covers the 22-year planning period of the Master Plan and focuses on projects expected to be implemented within the first seven years of the Master Plan. It consists of an overview of the environmental constraints for the purposes of facilitating the preparation of environmental documentation under the National Environmental Policy Act (NEPA). It will also facilitate the preparation of an Initial Study (IS) pursuant to the California Environmental Quality Act ("CEQA," Cal. Public Resources Code 21000 et seq.).

Tehachapi Municipal Airport is located approximately 36 miles southeast of Bakersfield and 16 miles northwest of Mojave in the northern portion of the City of Tehachapi in southern Kern County, California. The airport serves a variety of users. In addition to general aviation flight training, personal and business flying, the airport acts as a reliever airport for aircraft cargo flights by DHL, UPS, and FedEx when Bakersfield is fogbound. The airport is also used to transport inmates to and from the California Correctional Institution. At times, the airport is used for transporting patients to nearby medical facilities. Several local business people commute to and from work by air on a regular basis. The airport can accommodate small commuter planes but not large commercial jets.

SUMMARY OF IMPROVEMENTS

The proposed improvements consist of the following phased development:

- Phase 1 Improvements (2003 to 2010)
    1. Widen and strengthen runway and relocate displaced threshold (2003).
    2. Prepare hangar sites at southwest corner for lease (2003-2004).
    3. Modify storm water basin southwest of Runway 11 (2003-2004).
    4. Resurface taxiway and apron pavement (2003-2005).
    5. Provide airport security system improvements ((2004).
    6. Install Automated Weather Observing System (AWOS) (2004).

7. Provide compass calibration pad and supplemental wind cone for Runway 29 (2004).
8. Install PAPI/PLASI on Runway 11 (2004-2005).
9. Install REILs on Runways 11 and 29 (2004-2005).
10. Extend Alan Avenue west of Dennison Road for north side airport access (2005-2006).
11. Construct partial north side parallel taxiway, runup apron, connecting taxiways, and parallel taxiline (2005-2006).
12. Construct nine hangars on north side of runway (2006-2007).
13. Construct Service Road, 20-feet wide (2006-2007).
14. Acquire aviation easements for runway protection zone (RPZ) areas (2008-2009).

- Phase 2 Improvements (2011 to 2015)

15. Extend north side airport access road to the west (Alan Avenue).
16. Extend partial north side parallel taxiway and taxilane and construct connecting taxiways.
17. Construct eight hangars on north side of runway.
18. Prepare FBO site for lease.
19. Construct storm water detention basin north Runway 11 (see 2001 Drainage Study).
20. Construct Drainage Improvements on the south airport perimeter (see 2001 Drainage Study).
21. Provide fire protection for aircraft parking aprons on south side.

- Phase 3 Improvements (2016 to 2025)

22. Construct drainage improvements on the south parallel taxiway (see 2001 Drainage Study).
23. Relocate south parallel taxiway 150 feet from runway centerline.
24. Install MITL taxiway lights on south parallel and connecting taxiways.
25. Construct 17 hangars on north side of runway.
26. Extend partial north side parallel taxiway and taxilane to west end and construct connecting taxiways.
27. Extend north side airport access road to the west.
28. Construct airport terminal/administration building, including transient parking.
29. Prepare aviation industrial site for lease.

AIRCRAFT OPERATIONS

Aircraft operations are forecast to reach 13,100 in 2010, 14,600 in 2015, and 17,900 by the year 2025, compared with 11,000 aircraft operations in 2001. Total annual operations were projected on the basis that the number of operation per based aircraft recently experienced would remain the same. In 2025, the majority of these operations will be handled by single engine piston aircraft. The mix of aircraft is expected to remain nearly the same as it is today, 94 percent

single engine piston and 6 percent multi-engine piston aircraft. By most environmental standards, the projected increase in airport operations is considered non-substantial. Additionally, since the aircraft mix will not change substantially, the general character of the existing airport is not expected to change significantly.

TOPICS FOR ENVIRONMENTAL ANALYSIS

The topics for the environmental constraints analysis are based on federal guidelines contained in FAA Order 5050.4A "Airport Environmental Handbook" (FAA, 1985) and include a total of 20 specific impact categories. Some of the following discussions are based on the City of Tehachapi General Plan, adopted in 1999. In addition, several topics that are usually required under CEQA have been addressed in this document for a more comprehensive environmental constraints analysis.

- Noise
- Compatible Land Use
- Social Impacts including Environmental Justice (EJ)
- Air Quality
- Water Quality
- Wetlands
- Floodplains
- Wild and Scenic Rivers
- Coastal Barriers
- Farmlands
- Light Emissions
- Coastal Zone Management Program
- Historic, Architectural, Archeological and Cultural Resources
- DOT Act, Section 4(f)
- Energy Supply and Natural Resources
- Biotic Communities
- Endangered and Threatened Species of Flora and Fauna
- Solid Waste Impacts
- Construction Impacts
- Induced Socioeconomic Impacts

Noise

FAA Order 5050.4A states that a noise analysis is not required when the proposal involves Airport Design Group I and II airplanes at utility airports (such as Tehachapi) where aircraft operations do not exceed 90,000 annually adjusted operations. It is noted that airport reference code (B-I) indicated on the ALP is intended to accommodate Design Group I aircraft and the total number of operations indicated by the long-term (2025) forecast is 17,900 annual aircraft operations, almost all of which are single engine airplanes. According to the Kern Regional Aviation System Plan of 1998, Tehachapi Municipal Airport would not have noise impacts since the increase in operations is not considered very large and the type of aircraft using the airport will not change. Thus, there would not be any adverse noise impacts.

There are no current Community Noise Equivalent Level (CNEL) contours developed for the airport. However, since the operation forecasts for 1998 in the 1987 Airport Master Plan are similar to the forecasts for 2025 in the current Master Plan (see Table 9-1), and they were used to develop future CNEL contours, it is anticipated that the 2025 operation forecasts would have similar CNEL contours. The 1998 CNEL contours from the 1987 Airport Master Plan are illustrated in the Noise Element of the City's General Plan, which indicates that the 65 CNEL

contour is anticipated to extend beyond the airport property at midfield, but is not anticipated to extend into residential areas (see Figure 9-1). If aircraft noise becomes an issue, CNEL contours could be developed for the 2025 operations forecast to confirm the results from the 1987 Airport Master Plan.

Table 9-1
Based Aircraft and Operations Forecasts for
Tehachapi Municipal Airport

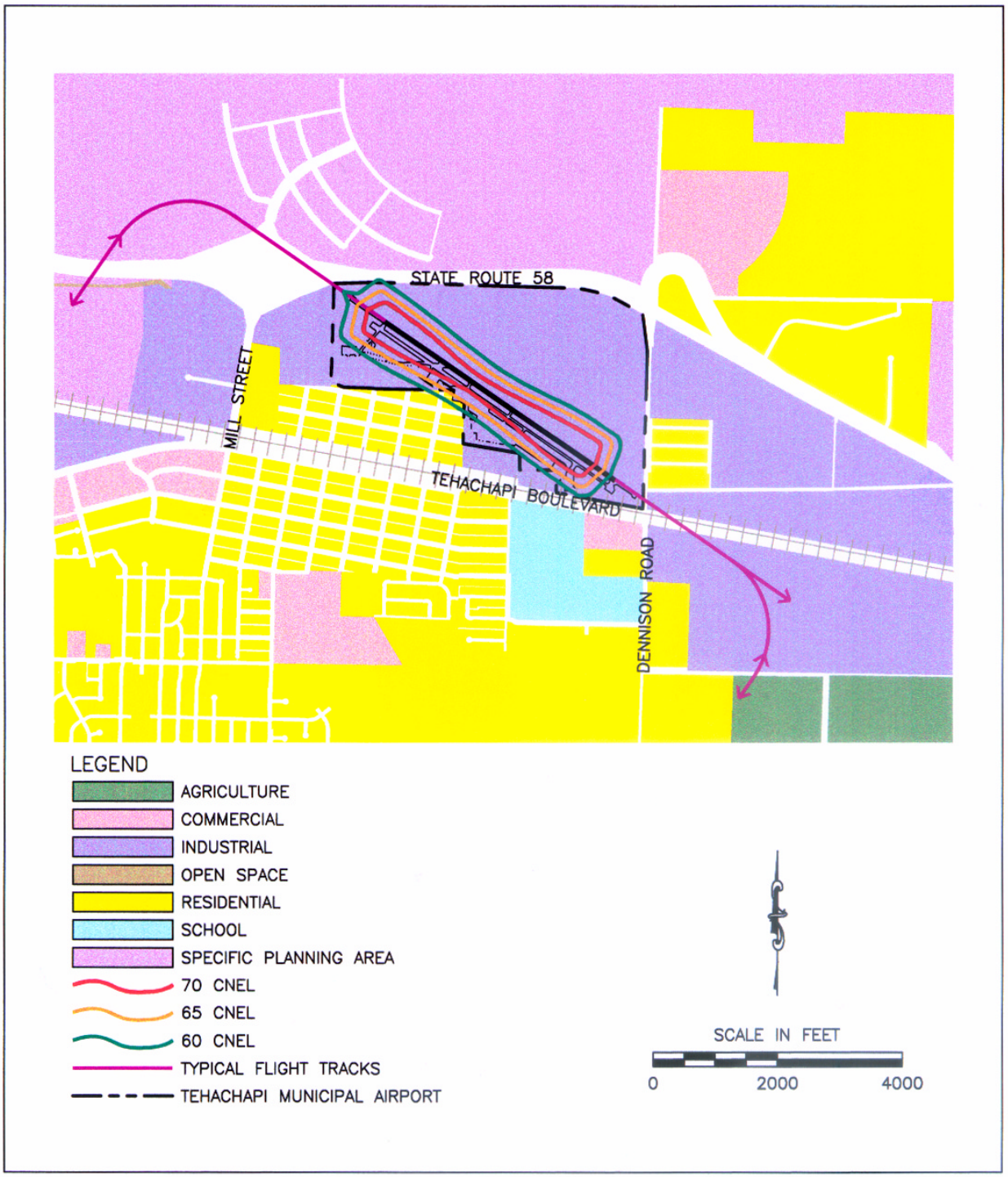
Item	Forecast	
	1998 Forecast from 1987 Master Plan [a]	2025 Forecast for Master Plan Update [b]
Based Aircraft		
Single Engine Piston	95	102
Multi Engine Piston	12	7
Other	2	0
Total Based Aircraft	109	109
Total Operations	18,500	17,900

[a] Source: Max P. Bacerra & Associates, Tehachapi Airport Master Plan, 1987.
[b] Source: DMJM Aviation.

Compatible Land Use

According to the Land Use Element of the City's General Plan, the Airport Layout Plan (ALP) is located in an area designated for Light Industrial (LI). The City encourages redevelopment plans within LI areas to promote economic vitality and aesthetic values. These plans may include provisions for mixed uses, aviation easements, buffers, and design standards to improve the aesthetic and economic development.

According to Government Code 658E0, City zoning ordinances shall be consistent with the adopted General Plan. The existing zoning for the ALP is LI, which is consistent with the General Plan designation. Therefore, airport improvements would be considered compatible with the existing land use. In addition, zoning overlays may be considered within land use area plans to further advance General Plan policies and City programs especially with plans affecting City owned property and revitalization areas like the airport.



Source: Tehachapi General Plan Update, Noise Element, October 18, 1999.

Figure 9-1
Estimated CNEL Noise Contours for Tehachapi Municipal Airport in 2025

Social Impacts including Environmental Justice

The principal social impacts considered are those associated with relocation or other community disruption, such as dividing an established community or altering surface transportation patterns. The airport improvements recommended in the ALP and Master Plan do not create such impacts. Although Alan Avenue west of Dennison Road will be extended, it will not affect the overall transportation routes around the airport or require relocation of any existing land use.

Air Quality

FAA Order 5050.4A indicates that as a general guideline, a level of 180,000 annual aircraft operations at a general aviation airport is the threshold requiring air quality analysis. The long-term forecast projects a total of 17,900 annual aircraft operations in the year 2025, which is less than one tenth of the threshold, and thus, it is concluded that air quality impacts will not be substantial. In addition, it is anticipated that the increase in airport operations will not result in any violation of State or regional air quality standards.

Water Quality

The proposed airport improvements may have the potential to alter the existing drainage pattern of the site which would result in erosion or siltation on- or off-site, interfere with groundwater discharge, or contribute to runoff water which may exceed the capacity of existing or planned storm water drainage systems. In addition, the storm water runoff may contain contaminants. According to the Tehachapi Airport Drainage Study conducted in March 2001, there are several existing drainage related problem areas at the airport site. Flooding of some buildings has been reported to occur just north of the Green Street entrance and north of Mojave Street. Ponding of paved and unpaved areas has also occurred at the east tie-down area, the area north of Trailer Park, the hangar area east of the Green Street entrance, and at the administration area. Erosion and siltation is present in the mentioned flooding areas and the westerly extension of the future road easement south of the Green Street Entrance.

The existing drainage system at Tehachapi Airport consists of the following components:

- Levied channel that carries storm water through the airport property from southeast to northwest.
- Off-site watershed south of the airport.
- On-site storm water retention basin that directly serves the airfield and aviation areas on the south side of the runway.
- On-site open ditches and culverts systems to convey localized storm flow.

The airport drainage improvements recommended in the Tehachapi Airport Drainage Study have been included in the airport master plan recommendations. These improvements will help minimize existing drainage related problems mentioned above. The proposed improvements

include a regional storm drainage facility to convey offsite water across the site and two separate watersheds.

Wetlands

Impacts expected on wetlands are either non-substantial or non-existent because there are no known wetlands occurring on the site.

Floodplains

Impacts expected on floodplains are either non-substantial or non-existent because there are no known floodplains occurring on the site.

Wild and Scenic Rivers

Impacts expected on wild and scenic rivers are either non-substantial or non-existent because there are no rivers identified as "wild and scenic rivers" on or near the site.

Coastal Barriers

Impacts expected on coastal barriers are either non-substantial or non-existent because the Tehachapi Municipal Airport is located approximately 80 miles inland.

Farmlands

Impacts expected on prime farmland, farmland of statewide importance, or unique farmland is either non-substantial or non-existent, because there are no known prime farmlands, farmland of statewide importance, or unique farmland occurring on the site.

Light Emissions

Airport improvements are not expected to create unusual circumstances that would be considered sufficient to warrant a special study. Normally, impacts of light improvements at airports are not substantial. The major light improvements include runway lighting, taxiway lighting, and lighting for the extension of Alan Avenue west of Dennison Road. Lighting improvements related to runways or taxiways are identified as categorical exclusions under FAA Order 5050.4A and do not require any formal environmental assessment. However, lighting improvements to the extension of Alan Avenue are not considered as categorical exclusions because it is street lighting. Extension of Alan Avenue will provide public access to the northern part of the airport and will be subject to City design standards to minimize glare from lighting improvements. It is essential that lighting improvements do not affect the pilot's vision when approaching the runway during evening flights.

Coastal Zone Management Program

Impacts expected on coastal zone management are either non-substantial or non-existent because the Tehachapi Municipal Airport is located approximately 80 miles inland.

Historic, Architectural, Archeological and Cultural Resources

According to the Conservation Element of the City's General Plan, the Tehachapi area can be characterized as highly sensitive from an archeological resources perspective. The study area identified in the General Plan and the surrounding communities comprising what is commonly referred to as the Greater Tehachapi Region is the ancestral home of the Kawaiisu cultural group. Archaeological surveys in the Tehachapi area have resulted in the location of archeological and historical sites as well as isolated artifacts.

The Southern San Joaquin Valley Information Center (Center) is under contract to the State Office of Historic Preservation and is responsible for the local management of the California Historical Resources Inventory. The Center has cultural resources site files for the Tehachapi area. These files include known and recorded archaeological and historic sites, inventory, and excavation reports and properties listed on the National Register of Historic Places, the California Historical Landmarks, the California Inventory of Historic Resources, and the California points of Historic Interest. Therefore, it is recommended that a historic resources and cultural resources database search be conducted to establish what, if any, historic resources or cultural resources of value exist on the site.

Department of Transportation Act, Section 4(f)

There are no parks, recreation areas, wildlife, or waterfowl reservations in the immediate airport vicinity and the proposed project or its long-term effects would not in any way impact these resources. The closest park, on Curry Street, is a community park located half a mile immediately west of the western airport boundary. This park will not be affected by the airport master plan operations. The noise levels at the boundary of the airport stay well below acceptable levels for outdoor residential land use based on the projected CNEL. Therefore, the airport improvements would not interfere with the outdoor recreational use which is generally considered a much less sensitive land use.

Energy Supply and Natural Resources

The improvements recommended in the master plan have the potential to result in a demand for services and expansion of the urban service network. This increased demand may contribute to a cumulative regional impact on the energy supply and natural resources. Therefore, it is recommended that prior to approval of airport improvements, power companies or other suppliers of energy shall be contacted to determine whether the demand can be met by existing or planned source facilities.

Biotic Communities

Review of aerial photographs reveals that there is very little natural land within the confines of the airport. The overall area is greatly disturbed by the previous agricultural operations and urban development. Some areas proposed for airport improvements are already in use or have been in use in the past. They are absent of any vegetation. Nevertheless, there is a possibility of having sensitive, rare, or endangered species on the site. Further study on the site would be necessary to establish whether they are present. Therefore, it is recommended that a biological assessment and biological database search be conducted to establish what, if any, wildlife or plants of value exist on the site.

Endangered and Threatened Species of Flora and Fauna

There are no known environmentally sensitive areas identified within the airport master plan. However, depending on the finding of the biological assessment and data base search, a previously unidentified environmentally sensitive area or condition may be identified within the boundaries of the airport. Refer to the discussion above.

Solid Waste Impacts

Airport improvements that relate only to airfield development such as runways, taxiways, and related items will not directly impact solid waste collection, control, or disposal other than that associated with the construction. As additional improvements occur under the master plan, the amount of solid waste generated will increase, placing an additional burden on local landfills. This waste may contribute to the cumulative regional impacts on landfill capacity. Therefore, it must be determined if there is any potential problem with either capacity of available disposal facilities or location of solid waste which may violate any local, State, or federal regulations. In addition, special attention should be given to the control of hazardous waste.

Construction Impacts

Construction impacts are either non-substantial or non-existent. Specific efforts during construction may create impacts that are subject to local, State, or federal ordinances or regulations. For example, the Noise Element of the City's General Plan states that the only means to control construction noise and maintenance equipment is through regulation of hours of use. As discussed under noise, there are relatively few sensitive uses within sensitive receptors on site near the areas of construction. However, construction plans should be reviewed for sensitive receptors near the construction area and where they are present, hours of construction where noise is typically high may be scheduled after operation of those uses within sensitive receptors.

Induced Socioeconomic Impacts

Impacts expected due to induced socioeconomic impacts are either non-substantial or non-existent because all project improvements are within airport property and no relocation of residential or commercial uses will be necessary.

Cumulative Implications

By definition under CEQA and NEPA, cumulative effects are those effects that occur when a series of small and seemingly insignificant effects occur, but when considered together, the effects are substantial. These increments can occur over a long period of time to the point where the effect is substantial (e.g., loss of critical habitat for a species). These increments can also occur over a very short period of time where the implications of one project are overlooked by another project and the effects are identified too late in the process to mitigate or avoid.

Airport improvements in conjunction with City approved projects may have some cumulative effects or implications to the energy supply, natural resources, and solid waste facilities. Currently, the City of Tehachapi has approved the following ten projects, but they have not yet been built.

- Dollar Tree Store on Tucker Road
- Tentative Tract Map 4927 on Cherry Lane
- Tentative Tract Map 5812 on Dennison Road
- Tract Map 6062 on Curry and Highline
- Addition to Anatase Products on Goodrick Drive
- Wade Trucking on Tehachapi Boulevard
- Tentative Parcel Map 10844 on Tehachapi Boulevard
- 79 Unit Apartment Building on H Street
- Walgreen on Tehachapi Boulevard
- 26-room additional to Hotel on Stueber Road

Short-term vs. Long-term Implications

There are no short-term or long-term goals that have been compromised by the proposed master plan. The Airport Master Plan itself is the fulfillment of a long-term goal regarding aviation growth in the City and surrounding area. It is a part of the transportation infrastructure for the City and airport network in California. No environmental goals have been identified for which the Airport Master Plan would be in conflict.

Summary

Based on the findings contained in the environmental constraints analysis, additional studies are recommended related to two environmental affects, which may occur as a result of the Master

Plan improvements. A historic resources and cultural resources database search is recommended to establish what, if any, historic resources or cultural resources of value exist on the site. A biological assessment and biological database search is recommended to establish what, if any, wildlife or plants of value exist on site. In addition, prior to approval of airport improvements, public service providers (energy supply, natural resources, solid waste) shall be contacted to determine whether the demand can be met by existing or planned service facilities.

This further action is anticipated to require an Initial Study be prepared pursuant to the California Environmental Quality Act (CEQA), which can be performed concurrently with the National Environmental Policy Act (NEPA) process. Because of the relatively minor changes recommended, the Master Plan improvements may fall under a categorical exclusion to the NEPA requirements. The necessary environmental documentation will be prepared according to FAA and City of Tehachapi standards and regulations.

APPENDIX A
GLOSSARY AND ABBREVIATIONS

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GLOSSARY AND ABBREVIATIONS

A

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

AC - Advisory Circular published by the Federal Aviation Administration.

ADPM - Average Day of the Peak Month.

AGL - Above Ground Level.

AIP – Airport Improvement Program.

AIRCRAFT MIX - The relative percentage of aircraft or aircraft operations at an airport by class of aircraft, often differentiated by gross takeoff weight and number of engines.

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

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 MASTER PLAN (UPDATE) - Long-range plan of airport development requirements.

ALP - Airport Layout Plan.

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.

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

APPROACH SURFACE - An element of the airport FAR Part 77 imaginary surfaces, longitudinally centered on the extended runway centerline, extending upward and outward from the end of the Primary Surface at a designated slope.

ARC – Airport Reference Code.

ARFF – Aircraft Rescue and Fire-Fighting.

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 generally 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 interference, 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.

BUSINESS JET - Any of a type of turbine powered aircraft carrying six or more passengers and weighing less than approximately 90,000 pounds gross takeoff weight.

C

CASP – California Aviation System Plan.

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).

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 pilots establish visual reference to the airport.

CL – Centerline.

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.

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 - Areas of controlled airspace that 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 - An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification, Class A, Class B, etc.

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.

CY - Calendar Year.

D

DBA – See A-WEIGHTED SOUND LEVEL.

DECISION HEIGHT (DH) - With respect to the operation of aircraft, 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.

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.

E

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.

F

F&E - Facilities and Equipment program of the FAA.

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

FAR - Federal Aviation Regulation.

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

FBO - Fixed Base Operator.

FEDERAL AIRWAYS - See LOW ALTITUDE AIRWAYS.

FINAL APPROACH - 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 – See AIRCRAFT MIX.

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

FY - Fiscal Year.

G

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

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

GPS - Global Positioning System.

H

HIGH ALTITUDE AIRWAYS - See Jet Routes.

HIRL - High Intensity Runway Lighting.

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, weather conditions below the minimum for flight under visual flight rules (see INSTRUMENT METEOROLOGICAL CONDITIONS).

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."

INSTRUMENT APPROACH - 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 landing or to a point from which a landing may be made visually.

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

INSTRUMENT METEOROLOGICAL CONDITIONS - Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.

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 modeling program.

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

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.

LIRL - Low Intensity Runway Lighting.

LITL – Low Intensity Taxiway Lighting.

LOC - Localizer (a component 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.

LONG – Longitude.

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

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 bone-shaped 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.

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.

MM - Middle Marker (a component of an ILS).

MOA - Military Operations Area.

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.

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 that reduces 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.

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

NOTAM – Notice to Airmen.

NPIAS - National Plan of Integrated Airport Systems.

O

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 (a component of an ILS).

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

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

P

PAC – Planning Advisory Committee for Airport Master Plan Update.

PAPI - Precision Approach Path Indicator.

PAR - Precision Approach Radar.

PCC - Portland Cement Concrete pavement.

PIREP – Pilot Report.

PLASI – A visual approach aid that provides vertical visual approach slope guidance by means of a single light source.

POSITIVE CONTROL - The separation of all air traffic within designated airspace by air traffic control.

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

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.

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

R

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

RAIL - Runway Alignment Indicator Lights.

REIL - Runway End Identification Lights.

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.

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

RPM – Revolutions per minute.

RUNWAY SAFETY AREA - An area symmetrical about the runway centerline and extending beyond the ends of the runway that must be free of obstacles as specified.

S

SALS - Short Approach Light System.

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.

SCAG – Southern California Association of Governments.

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).

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.

T

TACAN - Tactical Air Navigation.

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.

TERPS - Terminal Instrument Procedures.

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 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, base leg and final approach.

a. Upwind Leg- A flight path parallel to the landing runway in the direction of landing.

b. Crosswind Leg- A flight path at right angles to the landing runway off its upwind end.

c. Downwind Leg- A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.

d. Base Leg- A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.

e. Final Approach. A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. An aircraft making a straight-in approach VFR is also considered to be on final approach.

TRANSIENT AIRCRAFT – Aircraft not based at the airport.

TRANSITIONAL 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 - That portion of controlled airspace wherein aircraft change from one phase of flight or flight condition to another.

TVOR - Terminal Very High Frequency Omnirange Station.

U

UHF - Ultra High Frequency.

UNICOM - Radio communications station that 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 – A visual landing aid that provides vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams.

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

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.

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.

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

WORKING PAPER – Report describing interim findings of the Airport Master Plan Update.

APPENDIX B
BASED AIRCRAFT OWNERS SURVEY

City of Tehachapi, 115 South Robinson Street, Tehachapi, CA 93561-1722

TEHACHAPI MUNICIPAL AIRPORT MASTER PLAN UPDATE
BASED AIRCRAFT OWNERS SURVEY
(September 2002)

The City of Tehachapi is updating the airport master plan for Tehachapi Municipal Airport. An important master planning objective is to address improvements that owners of aircraft based at the airport feel are needed. Please help us by taking a moment of your time to respond to the following questions. You may return the completed questionnaire with the payment of your invoice. Thank you for your support of this important project.

George Walker, Airport Manager

1. Is (are) your aircraft owned by: ***[please check one]***

Individual		Business		Flying Club		Other:_____	

2. Where do you (the owner or primary operator of the aircraft) live?

State	County	City	Zip Code

3. Please provide the following information on how many aircraft you have at Tehachapi and your flying activity.

Aircraft Type	How Many Aircraft	Total Annual Hours Flown	Total Annual Takeoffs*	Percent Touch and Go
Single-engine piston - under 4 place				
Single-engine piston - 4 place and over				
Multi-engine piston				
Helicopter				
Other: _____				

* Include each touch-and-go as a takeoff.

4. Over the next five years, what do you anticipate your flying activity will be compared to the previous 12 months?

It will increase by this percent		It will decrease by this percent		It will be about the same	

5. What percentage of your flights are for the following purposes? ***[should add to 100%]***

Business	%	Personal	%	Training	%	Other	%

6. Please check the factors that most influenced you to locate your aircraft at Tehachapi Municipal Airport. ***[check all that apply]***

	Proximity to home		Availability of services
	Proximity to business		Cost of services
	Favorable flying conditions		Other:_____
	Availability of facilities		Other:_____

7. Please list in importance to you the main issues you would like to see addressed in the airport master plan update.

1.
2.
3.

8. Indicate by priority (from highest to lowest) the improvements you would like to see at the airport.

	Highest Priority 1	2	3	4	**Lowest Priority** 5
Additional T-hangars					
Additional Tiedowns					
Additional Transient Parking					
Pavement Resurfacing					
Wash Rack					
Expanded Security Program					
Improved Auto Access/Parking					
Navaids: _____					
Other: _____					
Other: _____					
Other: _____					

9. Please rate the adequacy of existing services and facilities at Tehachapi Municipal Airport.

	Excellent		**Satisfactory**		**Poor**
	1	2	3	4	5
Security					
FBO Services in General					
Flight Instruction					
Aircraft Maintenance					
Fueling					
Navigational Aids					
Transient Parking					
Tiedowns					
Auto Parking					
Hangar Facilities					
Restrooms					
General Aviation Terminal					
Pavement Condition					
Other: _____					
Other: _____					

10. Please rate the costs of services at the airport.

	Very Low		**Average**		**Very High**
	1	2	3	4	5
Flight School Rates					
Maintenance Rates					
Fuel Costs					
Hangar Rental Rate					
Tiedown Rates					
Transient Parking Rates					

11. Please estimate the amount of money spent <u>annually</u> for the operation of your aircraft based at Tehachapi Municipal Airport. ***[give total of all aircraft if more than one aircraft is listed in Question 3]***

	Spent Locally in the Tehachapi Area	Spent Outside the Tehachapi Area*
Hangar/Tiedown	$	$
Fuel	$	$
Maintenance	$	$
Insurance	$	$
Other: _____	$	$
Annual Total	$	$

*Such as Bakersfield or Mojave or beyond.

12. Please use this space for additional comments you would like to provide pertaining to the airport or master plan update. ***[attach additional paper if necessary]***

13. Optional:

Name: _____

Telephone: _____

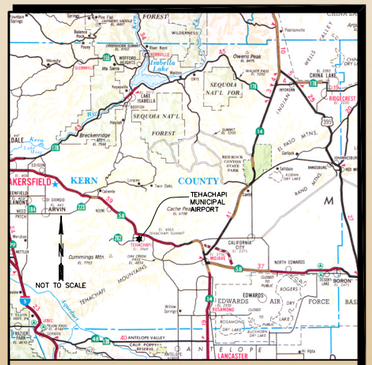
YOUR OPINIONS ARE VERY IMPORTANT.
THANK YOU FOR TAKING TIME TO COMPLETE THIS SURVEY.

APPENDIX C
AIRPORT PLAN SHEETS

TEHACHAPI MUNICIPAL AIRPORT
MASTER PLAN

LIST OF DRAWINGS

NO.	TITLE
1.	TITLE SHEET
2.	AIRPORT LAYOUT PLAN
3.	BUILDING AREA PLAN
4.	REVENUE–SUPPORTING AREA PLAN
5.	PART 77 AIRSPACE PLAN
6.	PART 77 INNER APPROACH SURFACES
7.	RUNWAY PROTECTION ZONE PLAN
8.	OFF–AIRPORT LAND USE PLAN
9.	EXHIBIT "A"



LOCATION MAP

VICINITY MAP

PREPARED FOR:

City of Tehachapi

Respecting Our Past - Planning Our Future

City of Tehachapi

FUNDED BY A GRANT FROM
THE FEDERAL AVIATION ADMINISTRATION
AIP NO. 3-06-0253-07

July 2004

PREPARED BY:

DMJM Aviation

DMJM Aviation
999 Town & Country Rd., 4th Floor
Orange, CA 92868

LEGEND

	EXISTING	ULTIMATE
AIRCRAFT PARKING LIMIT LINE (APL)		
AIRFIELD LIGHTS/REFLECTORS		SAME
AIRFIELD PAVEMENT		
AIRPORT BOUNDARY		
AIRPORT REFERENCE POINT (ARP)		SAME
BUILDING RESTRICTION LINE (BRL) (See Note 6)		
BUILDINGS (ON-AIRPORT)		
BUILDINGS TO BE REMOVED	NONE	
EXISTING WASTEWATER DISPOSAL PIPELINE		NONE
FENCE		
FENCE TO BE REMOVED	NONE	
GROUND CONTOURS	995'	SAME
LEASE LINE	NONE	
POWER POLE		SAME
REVENUE-SUPPORTING PROPERTY (See Note 2)		
ROAD/VEHICLE PARKING		
RPZ EASEMENT		
RUNWAY OBJECT FREE AREA (ROFA)/ OBSTACLE FREE ZONE (OFZ)		SAME
RUNWAY SAFETY AREA (RSA)		SAME
SECTION CORNER	17/16 20/21	SAME
STORM WATER DETENTION BASIN		
VEHICLE GATE AND OPERATOR	G	G
WASTEWATER DISPOSAL FIELD		NONE
WATER COURSE		

AIRPORT DATA

		EXISTING	ULTIMATE
AIRPORT ELEVATION		4,002'	SAME
AIRPORT REFERENCE POINT (ARP) COORDINATES	LATITUDE	35° 08' 05.90"N	SAME
	LONGITUDE	118° 26' 21.30"W	SAME
MEAN MAX. TEMP. OF HOTTEST MONTH		86.6° JULY	SAME
AIRPORT AND TERMINAL NAVAIDS		BEACON, PAPI (29)	NONE
AIRPORT REFERENCE CODE		B-I/SMALL	SAME
AIRPORT WIND COVERAGE % (13 KNOTS)		97.69	SAME
MISCELLANEOUS FACILITIES		LIGHTED SEGMENTED CIRCLE	SAME
DESIGN AIRCRAFT		BEECH KING AIR B100	SAME
GPS AT AIRPORT		NO	YES

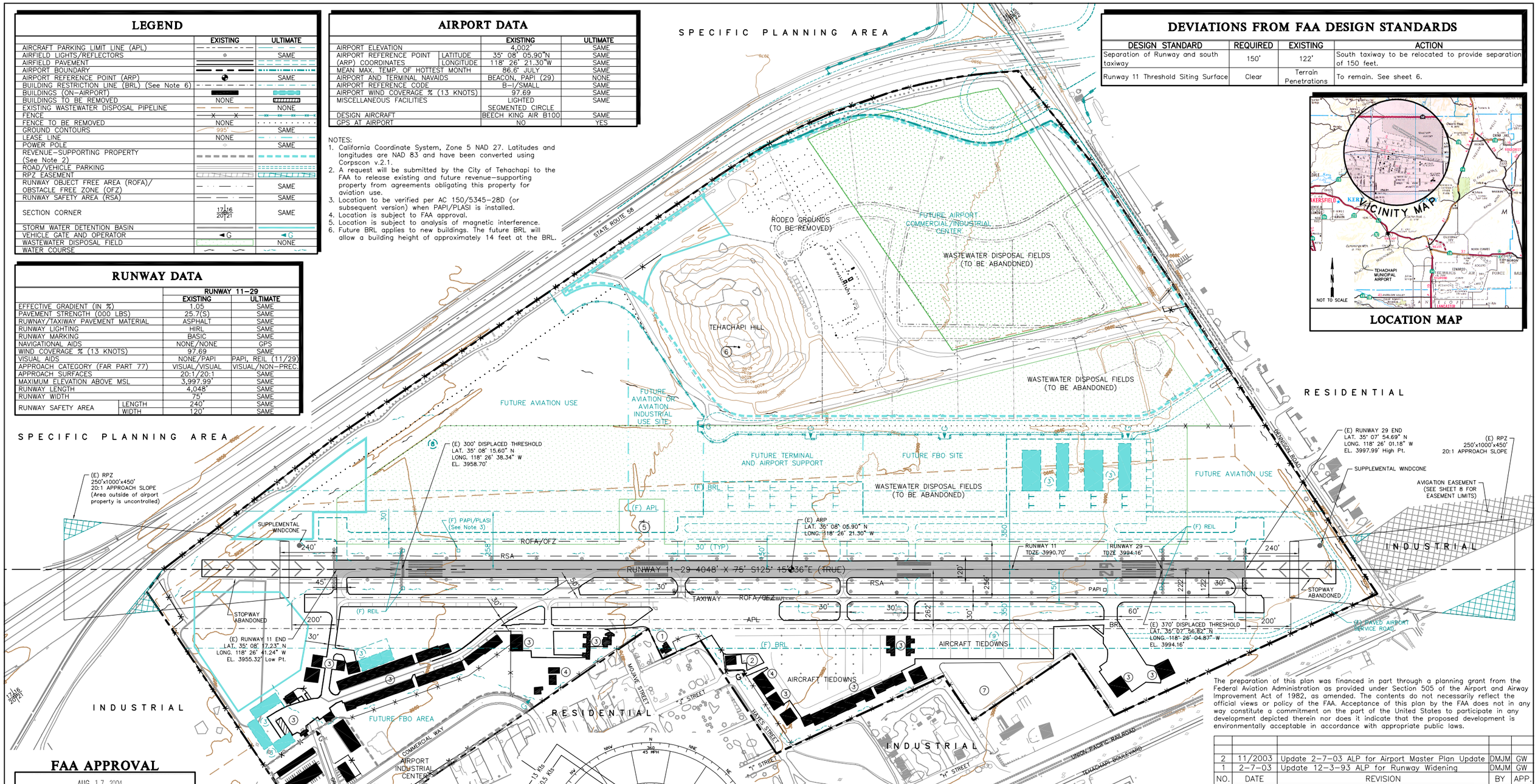
NOTES:
1. California Coordinate System, Zone 5 NAD 27. Latitudes and longitudes are NAD 83 and have been converted using Corpscon v.2.1.
2. A request will be submitted by the City of Tehachapi to the FAA to release existing and future revenue-supporting property from agreements obligating this property for aviation use.
3. Location to be verified per AC 150/5345-28D (or subsequent version) when PAPI/PLASI is installed.
4. Location is subject to FAA approval.
5. Location is subject to analysis of magnetic interference.
6. Future BRL applies to new buildings. The future BRL will allow a building height of approximately 14 feet at the BRL.

DEVIATIONS FROM FAA DESIGN STANDARDS

DESIGN STANDARD	REQUIRED	EXISTING	ACTION
Separation of Runway and south taxiway	150'	122'	South taxiway to be relocated to provide separation of 150 feet.
Runway 11 Threshold Siting Surface	Clear	Terrain Penetrations	To remain. See sheet 6.

RUNWAY DATA

		RUNWAY 11-29 EXISTING	RUNWAY 11-29 ULTIMATE
EFFECTIVE GRADIENT (IN %)		1.05	SAME
PAVEMENT STRENGTH (000 LBS)		25.7(S)	SAME
RUNWAY/TAXIWAY PAVEMENT MATERIAL		ASPHALT	SAME
RUNWAY LIGHTING		HIRL	SAME
RUNWAY MARKING		BASIC	SAME
NAVIGATIONAL AIDS		NONE/NONE	GPS
WIND COVERAGE % (13 KNOTS)		97.69	SAME
VISUAL AIDS		NONE/PAPI	PAPI, REIL (11/29)
APPROACH CATEGORY (FAR PART 77)		VISUAL/VISUAL	VISUAL/NON-PREC.
APPROACH SURFACES		20:1/20:1	SAME
MAXIMUM ELEVATION ABOVE MSL		3,997.99'	SAME
RUNWAY LENGTH		4,048'	SAME
RUNWAY WIDTH		75'	SAME
RUNWAY SAFETY AREA	LENGTH	240'	SAME
	WIDTH	120'	SAME



LOCATION MAP

The preparation of this plan was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this plan by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

NO.	DATE	REVISION	BY	APP.
2	11/2003	Update 2-7-03 ALP for Airport Master Plan Update	DMJM	GW
1	2-7-03	Update 12-3-93 ALP for Runway Widening	DMJM	GW

FAA APPROVAL

AUG 17 2004

Approved _____
FEDERAL AVIATION ADMINISTRATION
Western-Pacific Region
By _____
Supervisor, Standards Section

CITY OF TEHACHAPI APPROVAL:

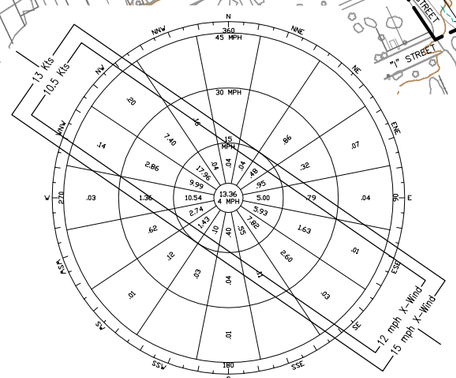
BY _____ CITY OF TEHACHAPI DATE

RUNWAY END COORDINATE DATA

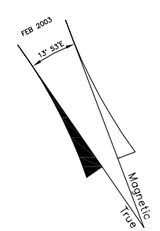
RUNWAY		EXISTING	ULTIMATE	EXIST. ELEV.	ULT. ELEV.
11	LATITUDE	35°08'17.23" N	SAME	3,955.32'	SAME
	LONGITUDE	118°26'41.24" W	SAME		
29	LATITUDE	35°07'54.69" N	SAME	3,997.99'	SAME
	LONGITUDE	118°26'01.18" W	SAME		

FACILITY KEY (① EXISTING/① FUTURE)

1. Airport Administration/Terminal Building
2. Fuel Facility
3. Hangars
4. FBO Facilities
5. Segmented Circle and Windcone
6. Airport Beacon
7. Airport Park (Airport Use Only)
8. Automatic Weather Observation Station (AWOS) (See Note 4)
9. Compass Calibration Pad (See Note 5)



WIND ROSE
Wind history from Air Weather Service Data Control unit 1942-1944.



ANNUAL RATE OF CHANGE -2 MIN/YEAR

SCALE IN FEET

200 0 200 400 800

ABBREVIATIONS

APL	Aircraft Parking Limit
ARP	Airport Reference Point
AWOS	Automatic Weather Observation Station
BRL	Building Restriction Line
(E)	Existing
EL	Elevation
Est.	Estimate
(F)	Future
FBO	Fixed Based Operator
HIRL	High Intensity Runway Edge Lights
Kts	Knots
LAT.	Latitude
LONG.	Longitude
MSL	Mean Sea Level
OFZ	Obstacle Free Zone
PAPI	Precision Approach Path Indicator
PLASI	Pulsating Approach Slope Indicator
Pt.	Point
REIL	Runway End Identifier Lights
ROFA	Runway Object Free Area
RPZ	Runway Protection Zone
RSA	Runway Safety Area
TDZE	Touch Down Zone Elevation

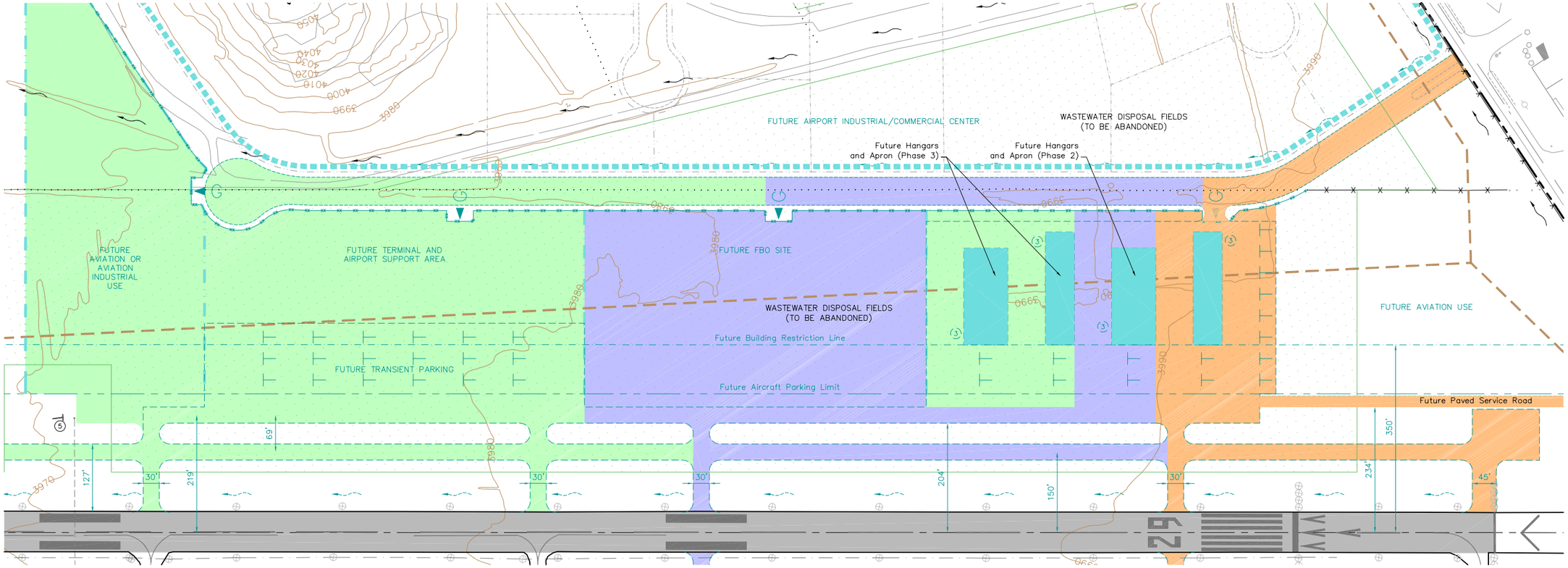
AIRPORT LAYOUT PLAN

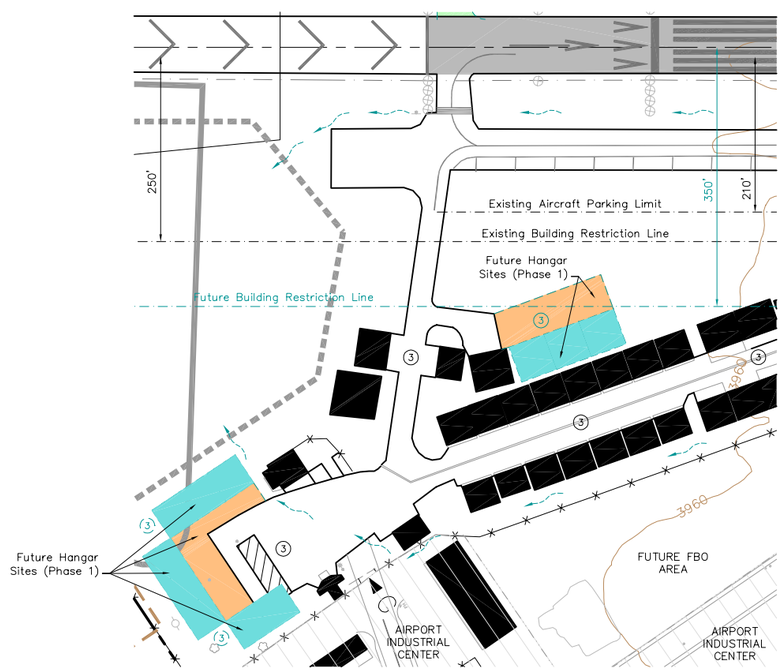
TEHACHAPI MUNICIPAL AIRPORT
TEHACHAPI, CALIFORNIA

City of Tehachapi
Respecting Our Past - Planning Our Future

DMJM Aviation
999 Town & Country Rd., 4th Floor
Orange, CA 92868

DESIGNED: AWS	CHECKED: SLA	SHEET 2 OF 9
DRAWN: AWS	DATE: July 2004	





FACILITY KEY (1 EXISTING/1 FUTURE)

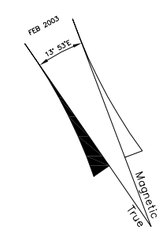
3 Hangars

5 Fuel Facility

NOTES:
1. Runway centerline will be displaced 12.5' to the north.
2. California Coordinate System, Zone 5 NAD 27. Latitudes and longitudes are NAD 83 and have been converted using Corpscon v.2.1.
3. A request will be submitted by the City of Tehachapi to the FAA to release existing and future revenue-supporting property from agreements obligating this property for aviation use.

LEGEND

	EXISTING	ULTIMATE
AIRCRAFT PARKING LIMIT LINE (APL)		
AIRFIELD LIGHTS/REFLECTORS		SAME
AIRFIELD PAVEMENT		
AIRPORT BOUNDARY		
BUILDING RESTRICTION LINE (BRL)		
BUILDINGS (ON-AIRPORT)		
BUILDINGS TO BE REMOVED	NONE	
EXISTING WASTEWATER DISPOSAL PIPELINE		NONE
FENCE	X X	
FENCE TO BE REMOVED	NONE	
GROUND CONTOURS	990	SAME
LEASE LINE	NONE	
PHASE 1 (2003 – 2010)	NONE	
PHASE 2 (2011 – 2015)	NONE	
PHASE 3 (2016 – 2025)	NONE	
POWER POLE		SAME
REVENUE-SUPPORTING PROPERTY (See Note 3)		
ROAD/VEHICLE PARKING		
STORM WATER DETENTION BASIN		
VEHICLE GATE AND OPERATOR	G	G
WASTEWATER DISPOSAL FIELD		NONE
WATER COURSE		



ANNUAL RATE OF CHANGE –2 MIN/YEAR

SCALE IN FEET

100 0 100 200 300

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NO.	DATE	REVISION	BY	APP.
1	4/2003	Update 11-87 Plan for Airport Master Plan Update	DMJM	GW

BUILDING AREA PLAN

TEHACHAPI MUNICIPAL AIRPORT
TEHACHAPI, CALIFORNIA

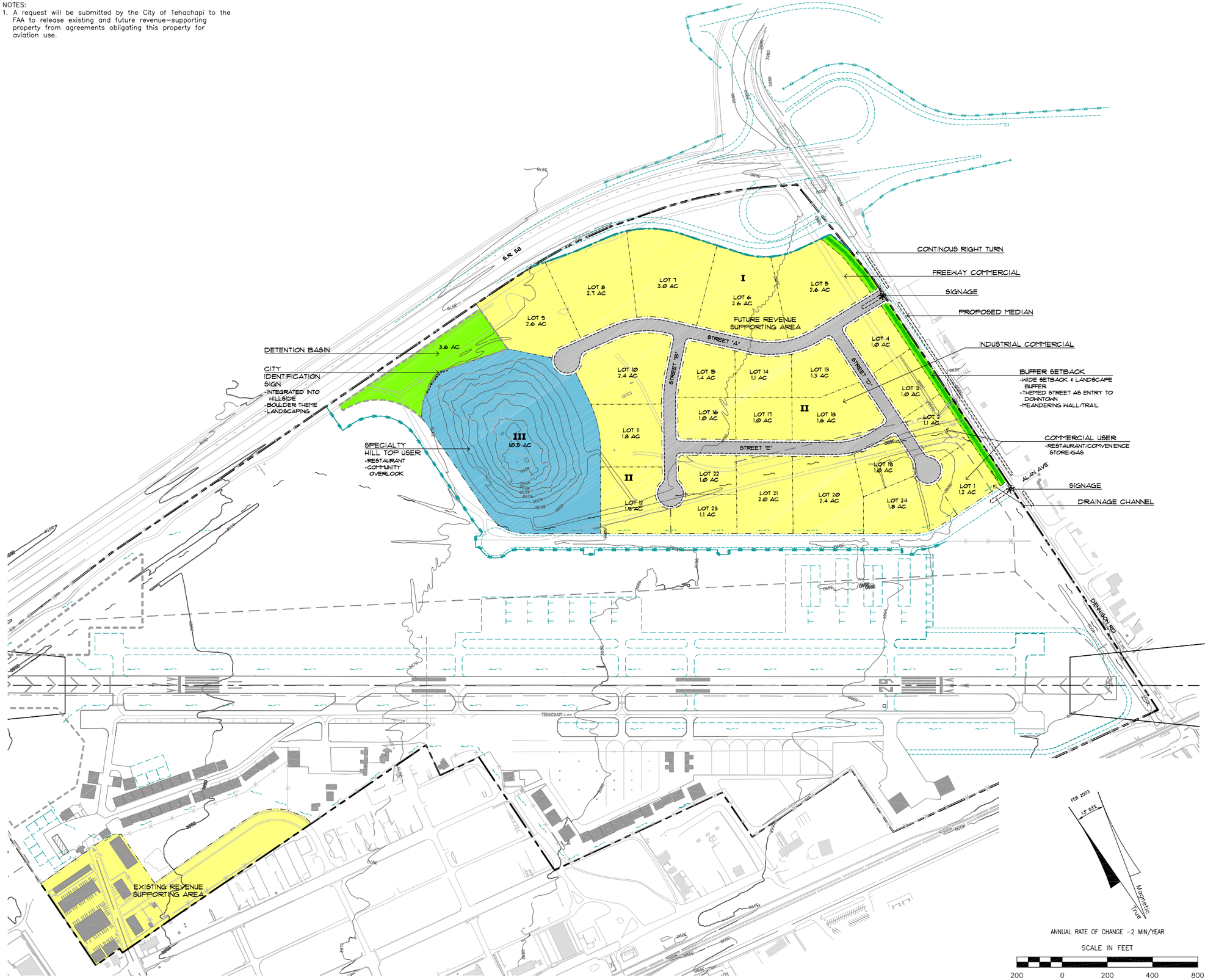
City of Tehachapi
Respecting Our Past · Planning Our Future

DMJM Aviation

DMJM Aviation
999 Town & Country Rd., 4th Floor
Orange, CA 92868

DESIGNED: AWS	CHECKED: SLA	SHEET 3 OF 9
DRAWN: AWS	DATE: July 2004	

NOTES:
1. A request will be submitted by the City of Tehachapi to the FAA to release existing and future revenue-supporting property from agreements obligating this property for aviation use.



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NO.	DATE	REVISION	BY	APP.

REVENUE-SUPPORTING AREA PLAN

TEHACHAPI MUNICIPAL AIRPORT
TEHACHAPI, CALIFORNIA

City of Tehachapi
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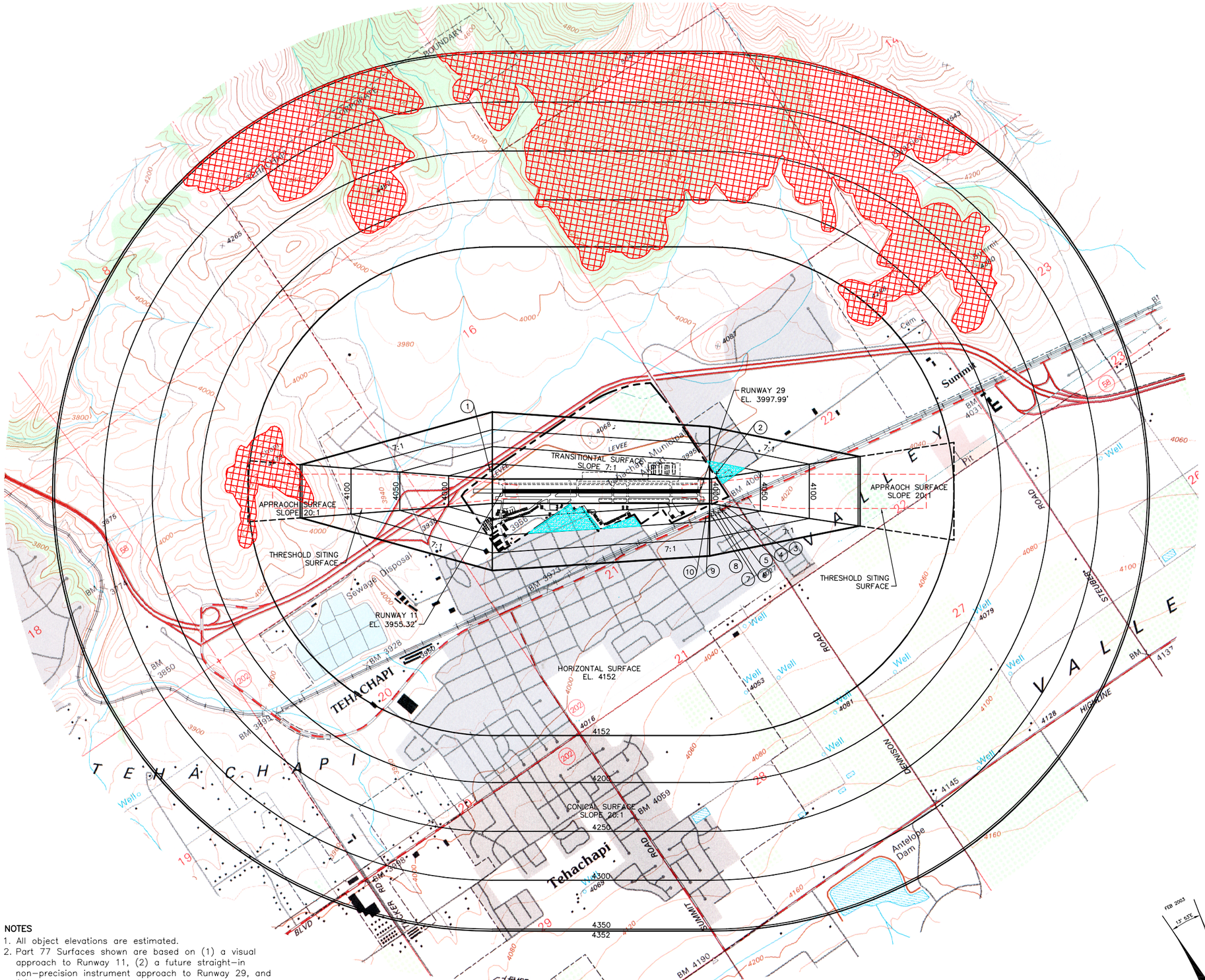

PART 77 OBSTRUCTION IDENTIFICATION TABLE

OBS. No.	DESCRIPTION	ELEV.	PENETR.	SURFACE	PROPOSED ACTION
1	STREET LIGHT	3,984'	-1'	TRANSITIONAL	NO PENETRATION
2	POLE	4,038'	20'	TRANSITIONAL	TO REMAIN
3	POLE	4,033'	17'	TRANSITIONAL	TO REMAIN*
4	POLE	4,049'	23'	TRANSITIONAL	TO REMAIN
5	POLE	4,031'	11'	TRANSITIONAL	TO REMAIN*
6	POLE	4,048'	18'	TRANSITIONAL	TO REMAIN
7	POLE	4,031'	6'	TRANSITIONAL	TO REMAIN*
8	POLE	4,047'	12'	TRANSITIONAL	TO REMAIN*
9	POLE	4,029'	1'	TRANSITIONAL	TO REMAIN*
10	POLE	4,046'	5'	TRANSITIONAL	TO REMAIN*
11-31	SEE SHEET 6				

*Does not penetrate existing Part 77 surface (See Note 2).

PENETRATION TO THRESHOLD SITING SURFACES

DESCRIPTION	ELEV.	PENETR.	RUNWAY	PROPOSED ACTION
TERRAIN WITH OL: 4,160' TO 5,000' FROM THRESHOLD	4,240'	46'	11	TO REMAIN

SURFACE ELEVATION

SURFACE	ELEV.
END OF RUNWAY 11	3,955.32'
END OF RUNWAY 29	3,997.99'
HORIZONTAL SURFACE	4,152'
CONICAL SURFACE (UPPER LIMIT)	4,352'
APPROACH SURFACE (11)-UPPER LIMIT	4,205.32'
APPROACH SURFACE (29)-UPPER LIMIT	4,247.99'

USGS MAPS USED FOR BASE

7.5 MIN. QUAD
TEHACHAPI NORTH (1992)
TEHACHAPI SOUTH (1992)

LEGEND

Terrain Penetration

Potential Obstructing Urban Area

NOTES

1. All object elevations are estimated.
2. Part 77 Surfaces shown are based on (1) a visual approach to Runway 11, (2) a future straight-in non-precision instrument approach to Runway 29, and (3) utility runways serving aircraft no more than 12,500 pounds maximum gross takeoff weight.
3. All elevations are in feet above mean sea level (MSL).
4. Negative penetrations in the Obstruction Identification Table represent distance clear to specified surface.
5. For obstructions within the approaches and airport property see sheet 6.

The preparation of this plan was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this plan by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

NO.	DATE	REVISION	BY	APP.

PART 77 AIRSPACE PLAN

TEHACHAPI MUNICIPAL AIRPORT
TEHACHAPI, CALIFORNIA

City of Tehachapi
Respecting Our Past - Planning Our Future

DMJM Aviation
999 Town & Country Rd., 4th Floor
Orange, CA 92868

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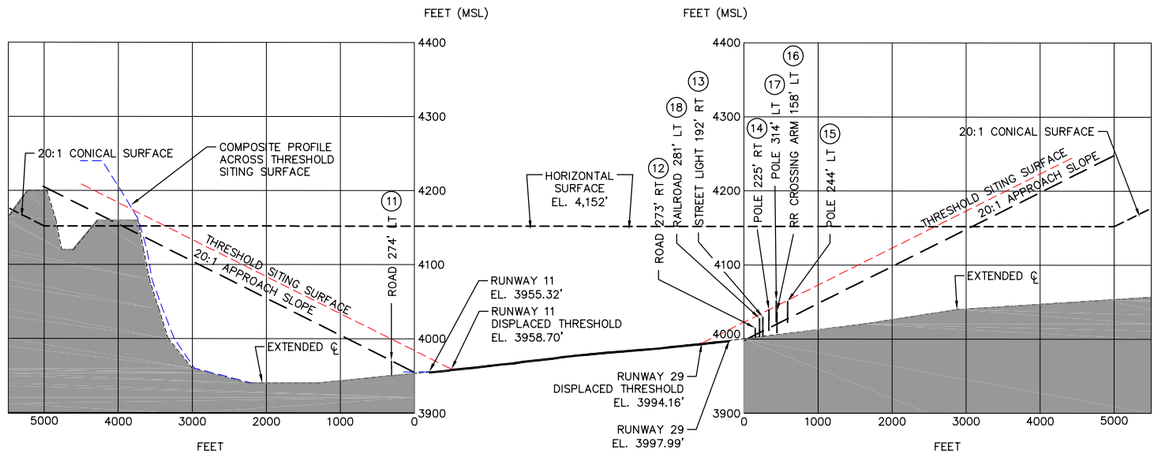
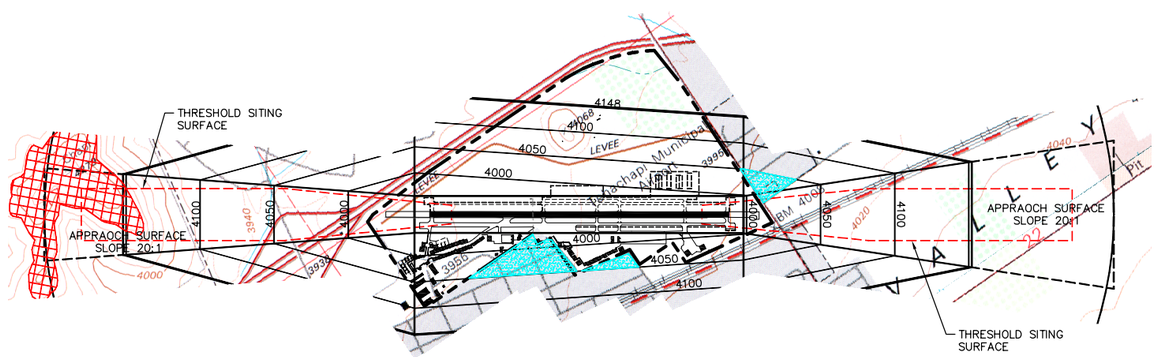




PART 77 OBSTRUCTION IDENTIFICATION TABLE

OBS. No.	DESCRIPTION	ELEV.	PENETR.	SURFACE	PROPOSED ACTION
1–10	SEE SHEET 5				
11	STATE ROUTE 58	3,970'	–2'	APPROACH	NO PENETRATION
12	DENNISON ROAD	4,015'	9'	APPROACH	TO REMAIN
13	STREET LIGHT	4,030'	19'	APPROACH	TO REMAIN
14	POLE	4,040'	25'	APPROACH	TO REMAIN
15	POLE	4,051'	23'	APPROACH	TO REMAIN
16	RR CROSSING ARM	4,037'	17'	APPROACH	TO REMAIN
17	POLE	4,052'	32'	APPROACH	TO REMAIN
18	RAILROAD	4,028'	18'	APPROACH	TO REMAIN
19	HANGAR	4,016'	2'	TRANSITIONAL	TO REMAIN*
20	HANGAR	4,012'	3'	TRANSITIONAL	TO REMAIN*
21	HANGAR	3,999'	11'	TRANSITIONAL	TO REMAIN*
22	HANGAR	3,998'	10'	TRANSITIONAL	TO REMAIN*
23	POLE	3,996'	4'	TRANSITIONAL	TO REMAIN*
24	ANTENNA	3,993'	9'	TRANSITIONAL	TO REMAIN*
25	POLE	3,992'	19'	TRANSITIONAL	TO REMAIN
26	HANGAR	3,983'	10'	TRANSITIONAL	TO REMAIN*
27	HANGAR	3,982'	10'	TRANSITIONAL	TO REMAIN*
28	HANGAR	3,990'	19'	TRANSITIONAL	TO REMAIN
29	HANGAR	3,977'	7'	TRANSITIONAL	TO REMAIN*
30	HANGAR	3,980'	6'	TRANSITIONAL	TO REMAIN*
31	TOWER	4,058'	–22'	TRANSITIONAL	NO PENETRATION

*Does not penetrate existing Part 77 surface (See Note 2).

PENETRATION TO THRESHOLD SITING SURFACES

DESCRIPTION	ELEV.	PENETR.	RUNWAY	PROPOSED ACTION
TERRAIN WITH OL: 4,160' TO 5,000' FROM THRESHOLD	4,240'	46'	11	TO REMAIN

SURFACE ELEVATION

SURFACE	ELEV.
END OF RUNWAY 11	3,955.32'
END OF RUNWAY 29	3,997.99'
HORIZONTAL SURFACE	4,152'
CONICAL SURFACE (UPPER LIMIT)	4,352'
APPROACH SURFACE (11)–UPPER LIMIT	4,205.32'
APPROACH SURFACE (29)–UPPER LIMIT	4,247.99'

USGS MAPS USED FOR BASE

7.5 MIN. QUAD
TEHACHAPI NORTH (1992)
TEHACHAPI SOUTH (1992)

ABBREVIATIONS

℄	Runway Centerline
EL	Elevation
LT	Left of Extended Runway Centerline when Approaching Runway
MSL	Mean Sea Level
OL	Obstruction Light
RR	Right of Extended Runway Centerline when Approaching Runway
RT	Railroad

LEGEND

Terrain Penetration

Potential Obstructing Urban Area

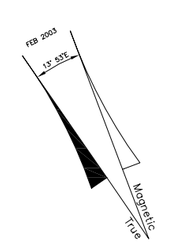
NOTES

1. All object elevations are estimated.
2. Part 77 Surfaces shown are based on (1) a visual approach to Runway 11, (2) a future straight–in non–precision instrument approach to Runway 29, and (3) utility runways serving aircraft no more than 12,500 pounds maximum gross takeoff weight.
3. All elevations are in feet above mean sea level (MSL).
4. Negative penetrations in the Obstruction Identification Table represent distance clear to specified surface.
5. For obstructions outside of the approaches and airport property see sheet 5.

SCALE IN FEET

1000 0 1000 2000 3000

VERTICAL SCALE: 1 INCH = 100 FEET



ANNUAL RATE OF CHANGE –2 MIN/YEAR

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NO.	DATE	REVISION	BY	APP.

PART 77 INNER APPROACH SURFACES

TEHACHAPI MUNICIPAL AIRPORT
TEHACHAPI, CALIFORNIA

City of Tehachapi
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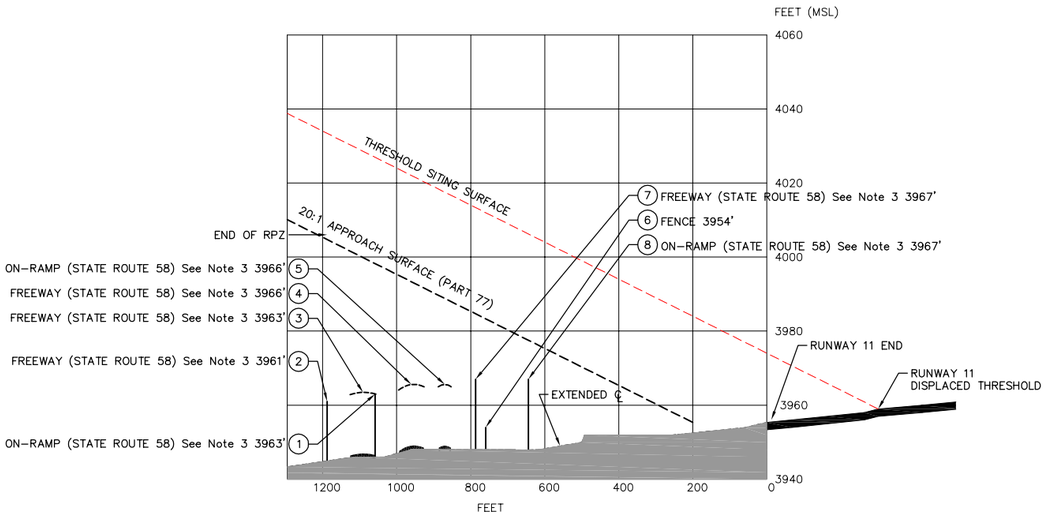
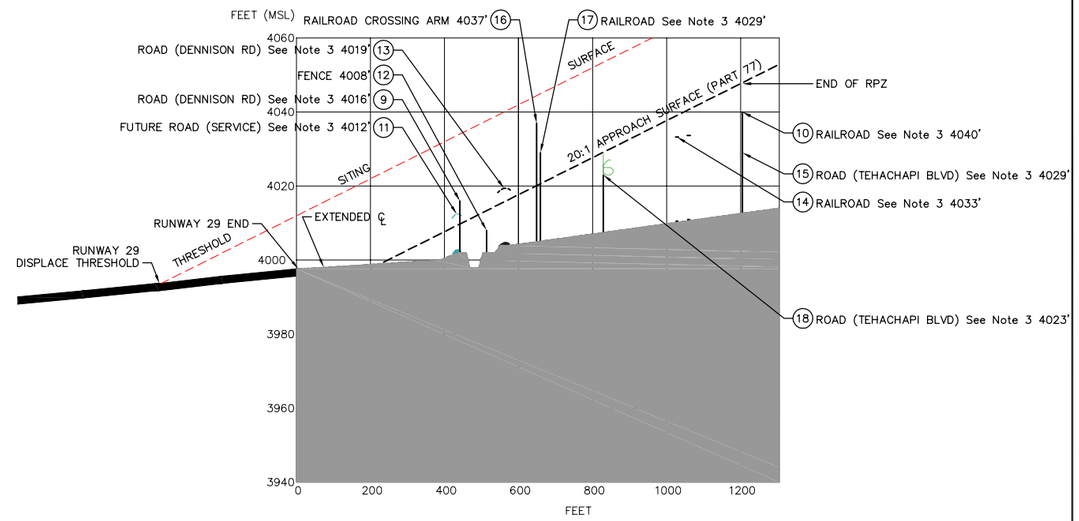
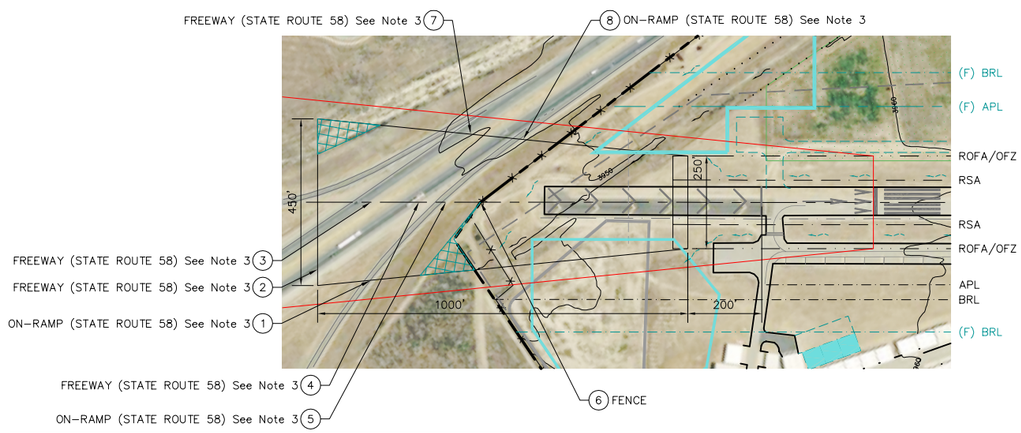
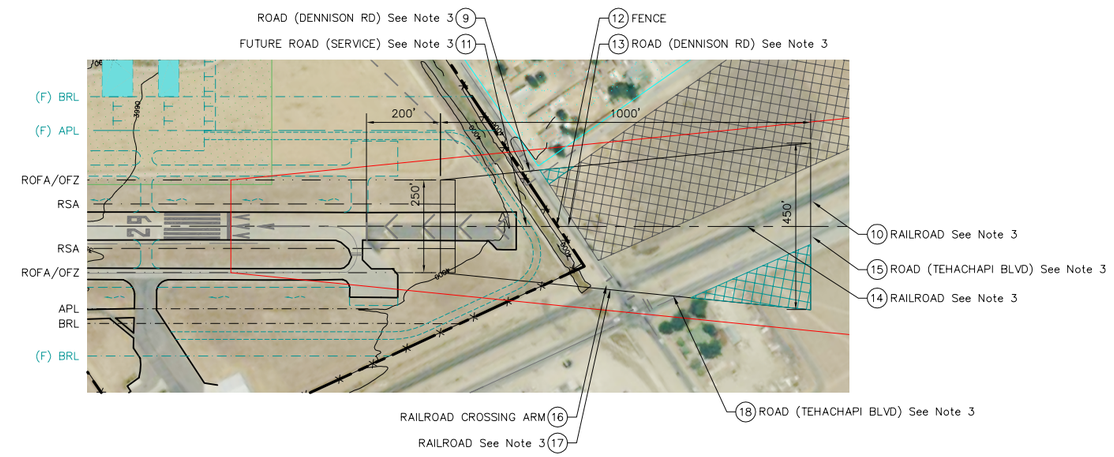
DRAWN: AWS	DATE: July 2004	









LEGEND

	EXISTING	ULTIMATE
AIRCRAFT PARKING LIMIT LINE (APL)		
AIRFIELD PAVEMENT		
AIRPORT BOUNDARY		
BUILDING RESTRICTION LINE (BRL) (See Note 5)		
FUTURE BUILDINGS	NONE	
EXISTING WASTEWATER DISPOSAL PIPELINE		NONE
FENCE	X X	xx xx xx xx
FENCE TO BE REMOVED	NONE	
GROUND CONTOURS	995'	SAME
FUTURE ROAD/VEHICLE PARKING		
RPZ EASEMENT		
RUNWAY OBJECT FREE AREA (ROFA)/ OBSTACLE FREE ZONE (OFZ)		
RUNWAY SAFETY AREA (RSA)		
STORM WATER DETENTION BASIN		
WASTEWATER DISPOSAL FIELD		NONE
WATER COURSE		

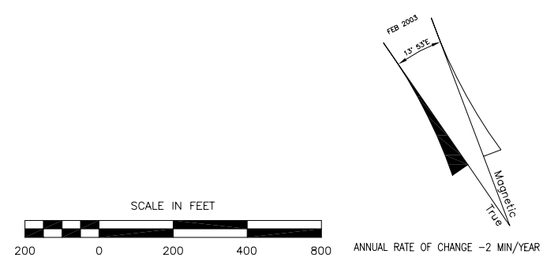
PART 77 OBSTRUCTION IDENTIFICATION TABLE

OBS. No.	DESCRIPTION	ELEVATION	PENETRATION	PROPOSED ACTION
1	ON-RAMP (STATE ROUTE 58)	3963'*	-35	NO PENETRATION
2	FREEWAY (STATE ROUTE 58)	3961'*	-44	NO PENETRATION
3	FREEWAY (STATE ROUTE 58)	3963'*	-36	NO PENETRATION
4	FREEWAY (STATE ROUTE 58)	3966'*	-28	NO PENETRATION
5	ON-RAMP (STATE ROUTE 58)	3966'*	-23	NO PENETRATION
6	FENCE	3954'	-29	NO PENETRATION
7	FREEWAY (STATE ROUTE 58)	3967'*	-18	NO PENETRATION
8	ON-RAMP (STATE ROUTE 58)	3967'*	-11	NO PENETRATION
9	ROAD (DENNISON RD)	4016'*	6	TO REMAIN
10	RAILROAD	4040'*	-8	NO PENETRATION
11	FUTURE ROAD (SERVICE)	4012'*	3	NONE
12	FENCE	4008'	-5	NO PENETRATION
13	ROAD (DENNISON RD)	4019'*	4	TO REMAIN
14	RAILROAD	4033'*	-6	NO PENETRATION
15	ROAD (TEHACHAPI BLVD)	4029'*	19	TO REMAIN
16	RAILROAD CROSSING ARM	4037'	17	TO REMAIN
17	RAILROAD	4029'*	8	TO REMAIN
18	ROAD (TEHACHAPI BLVD)	4023'*	-6	NO PENETRATION

*See Note 3

NOTES

1. All elevations are in feet above mean sea level (MSL).
2. Negative penetrations in the Obstruction Identification Table represent distance clear to specified surface.
3. Fifteen feet added to road elevations. Seventeen feet added to freeway elevations. Twenty-three feet added to railroad track elevations.
4. All elevations are estimates.
5. Future BRL applies to new buildings.



The preparation of this plan was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this plan by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

NO.	DATE	REVISION	BY	APP.

RUNWAY PROTECTION ZONE PLAN

TEHACHAPI MUNICIPAL AIRPORT
TEHACHAPI, CALIFORNIA

City of Tehachapi
Respecting Our Past - Planning Our Future

DMJM Aviation
DMJM Aviation
999 Town & Country Rd., 4th Floor
Orange, CA 92868

DESIGNED: AWS	CHECKED: SLA	SHEET 7 OF 9
DRAWN: AWS	DATE: July 2004	

STATE ROUTE 58

TEHACHAPI MUNICIPAL AIRPORT

60 CNEL
65 CNEL
70 CNEL

TEHACHAPI BOULEVARD

UNION PACIFIC RAILROAD

DENNISON ROAD

MILL STREET

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NO.	DATE	REVISION	BY	APP.

OFF-AIRPORT LAND USE PLAN

TEHACHAPI MUNICIPAL AIRPORT
TEHACHAPI, CALIFORNIA

City of Tehachapi
Respecting Our Past - Planning Our Future

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DESIGNED: AWS	CHECKED: SLA	SHEET 8 OF 9
DRAWN: AWS	DATE: July 2004	

LEGEND

	EXISTING
AGRICULTURE	
COMMERCIAL	
INDUSTRIAL	
OPEN SPACE	
RESIDENTIAL	
SCHOOL	
PARKS	
SPECIFIC PLANNING AREA	
AVIGATION EASEMENT	
60 CNEL	
65 CNEL	
70 CNEL	
FUTURE AIRPORT PROPERTY LINE	
TYPICAL FLIGHT TRACKS	
AIRPORT PROPERTY LINE	
FUTURE AIRFIELD	
RUNWAY PROTECTION ZONE	
RUNWAY SAFETY AREA	

Source: City of Tehachapi, Tehachapi General Plan Update, Land Use Element, Adopted August 19, 1996, and Noise Element, Adopted October 18, 1999.

SCALE IN FEET

500 0 500 1000 1500

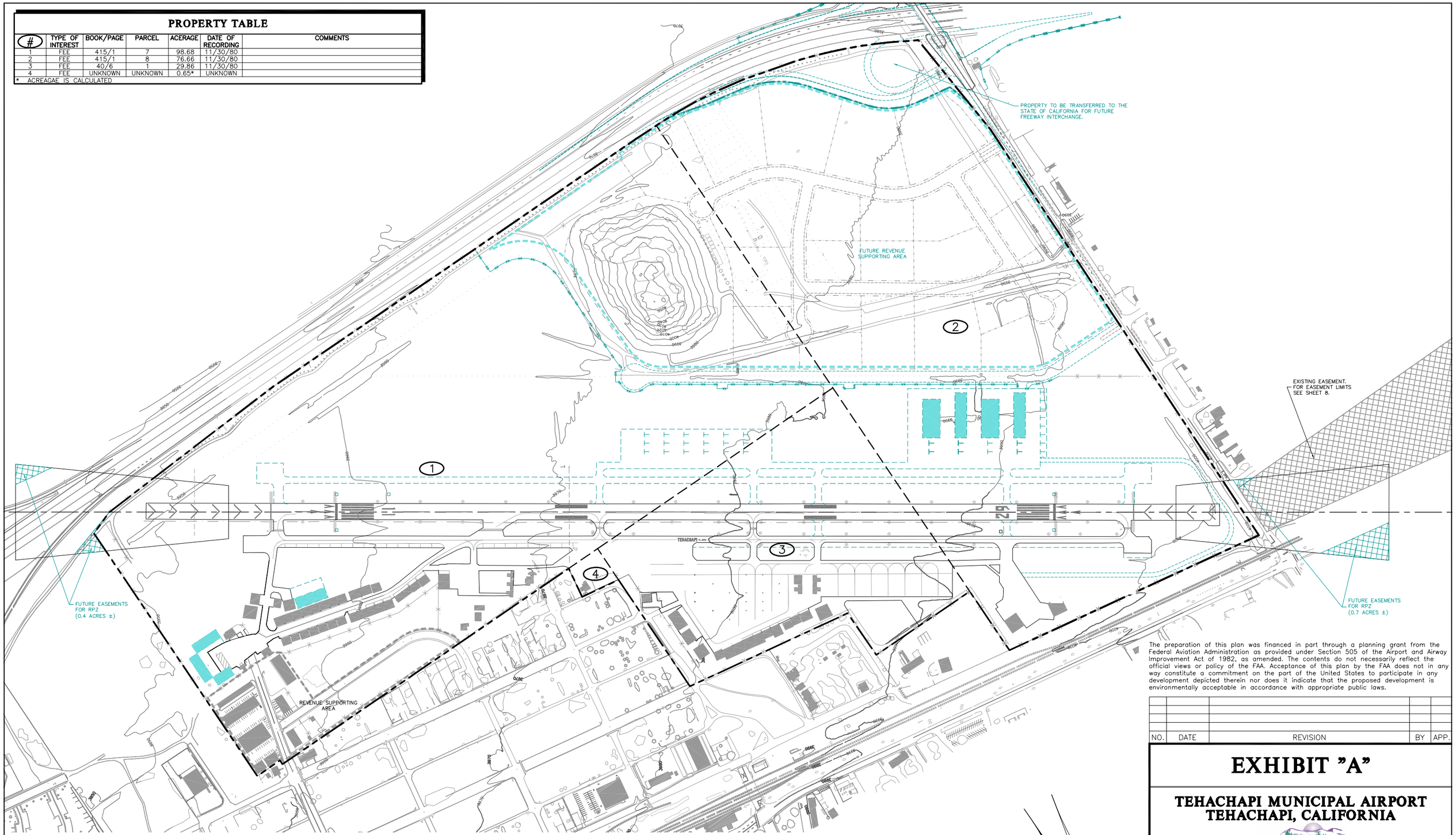
JUNE 2002
13° 54'E
Magnetic
True

ANNUAL RATE OF CHANGE -2 MIN/YEAR

PROPERTY TABLE

#	TYPE OF INTEREST	BOOK/PAGE	PARCEL	ACERAGE	DATE OF RECORDING	COMMENTS
1	FEE	415/1	7	98.68	11/30/80	
2	FEE	415/1	8	76.66	11/30/80	
3	FEE	40/6	1	29.86	11/30/80	
4	FEE	UNKNOWN	UNKNOWN	0.65*	UNKNOWN	

* ACREAGAE IS CALCULATED



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NO.	DATE	REVISION	BY	APP.

EXHIBIT "A"

TEHACHAPI MUNICIPAL AIRPORT
TEHACHAPI, CALIFORNIA

City of Tehachapi
Respecting Our Past - Planning Our Future

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Orange, CA 92868

SCALE IN FEET
200 0 200 400 800

ANNUAL RATE OF CHANGE -2 MIN/YEAR

DESIGNED: AWS	CHECKED: SLA	SHEET 9 OF 9
DRAWN: AWS	DATE: July 2004	

NOTES:
1. Boudary lines were established from Assessor Maps.
2. Unless otherwise stated Book, Page, and Parcel information in the Property Table references Assessor Maps.

APPENDIX D
SURVEY OF RATES AND CHARGES

Table D-1
Market Survey of General Aviation Airport Rates and Charges, February 2003

	Kern County										Los Angeles County		San Bernardino County	
	Bakersfield Municipal	**California City**	**Delano**	**Inyokern**	**Kern Valley**	**Mojave**	**Mountain Valley**	**Rosamond**	**Shafter/Minter Field**	**Taft**	**Agua Dulce**	**Fox Airfield**	**Apple Valley**	**Barstow-Daggett**
Hangar Rents														
T-hangars - Monthly	$160	$170	$90	$182	NA	35¢/SF on FL 19¢/SF off FL	NA	NA	$97	$61-$75	NA	$150	$130	$390-$400[i]
Large hangars - Monthly	$180	$250-$500 [g]	$135	$225-$242	NA		NA	NA	$145-$197	NA	NA	$550	$250-$340	$425[i]
Outdoor Storage														
Daily - Tiedown	$5	$5 ($3 W/Gas Purchase)	$2	$4 (First Night free W/Gas Purchase)	NA	$0	$3	$5	$2	10% of tiedown rate	$0	$5	$5SE/$8TW	NA
Monthly - Tiedown	$40	$25 SE/$35 TW/ $40 GL/$55 LTW	NA	$41SE/$80TW	NA	$25	$25	$55	$25	$21	$65	$54SE/$65TW	$55	$50
Sunshade	NA	NA	$45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Flowage Fees														
Per Gallon of Fuel	8¢	NA	NA	10¢	6¢	5¢	NA	NA	NA	6¢	NA	20¢	6.5¢	6.5¢
Per Gallon of Lubricant	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5¢	7.5¢
FBO Land Leases														
Rate	NA	$250-$500/Year	1¢-7¢ SF/Year	13¢ SF/Year	6¢/AC/Month	35¢/SF on FL for BLDG 19¢/SF off FL for BLDG 5¢/AC on FL 2¢/AC off FL	NA	NA	3.5¢-5¢/SF/year set by Kern Co. 15¢-18¢/SF/ month not set by Kern Co.	NA	NA	2.5¢/SF/Month Unimproved 4.5¢/SF/Month Improved	2¢/SF/Month	2¢/SF/Month
Length of Term	NA	20 Year	15 Year	30 Year	17 Year [j]	Month-to-Month or 1-20 years	NA	NA	5-20 Year	NA	NA	30 Year	20 Year	20 Year
Renewal Options	NA	(1) 5 Year	(3) 5 Year	(2) 5 Year	No	Varies	NA	NA	Varies	NA	NA	Negotiable	(1) 5 Year	(1) 5 Year
Reversionary Clause	NA	Yes [b]	Yes [c]	Yes	Yes [f]	Yes [b]	NA	NA	Yes [e]	NA	NA	Yes [b]	Yes [b]	Yes [b]
Private Hangar Land Lease														
Rate	$50/Month	$35/Month	3¢-7¢ SF/Month	$41/Month [h]	NA	$50/Month	3.5¢/SF/Month	NA	14¢/SF/Month	7.5¢/SF/Month	NA	2.5¢/SF/Month Unimproved 4.5¢/SF/Month Improved		
Length of Term	13 Years	$20	15 Years	30 Years	NA	5-30 Years	5 Year	NA	5-20 Year	20 Year	NA	30 Years	20 Year	20 Year
Renewal Options	(3) 5 Year	(1) 5 Year	(3) 5 Year	(2) 5 Year	NA	Varies	(4) 5 Year	NA	Unlimited	(2) 5 Year	NA	Negotiable	(1) 5 Year	(1) 5 Year
Reversionary Clause	Yes [a]	Yes [b]	Yes [c]	Yes	NA	Yes [d]	No	NA	Yes [e]	Yes [f]	NA	Yes [b]	Yes [b]	Yes [b]

Source: DMJM Aviation analysis

Note:

AC = Acre
BLDG = Building
FL = Flightline
GL = Glider
LTW = Large Twin
NA = Not applicable.
SE = Single Engine
TW = Twin

[a] Remove and return ground to original state, or structures return to City.
[b] Reverts to airport owner.
[c] Right to remove and return site to original state.
[d] Stays with tenant but Airport has first right of refusal.
[e] Tenant can sell, remove, or abandon.
[f] Right to remove, if not removed airport can choose to own or force removal.
[g] Rates depend on utilities and when contract started.
[h] Rate is associated with the tiedown rate. For example a hangar that is big enough to hold two Twins would be $160 a month.
[i] Includes Family Quarters.
[j] Airport permit expires in 2020.

APPENDIX E
SUPPORTABLE LOAN FOR HANGAR DEVELOPMENT

Table E-1
Calculation of Supportable Loan for
Hangar Development Cost
(all costs in constant 2003 dollars)

	Phase 1	Phase 2	Phase 3
Hangar Revenue Calculation			
Number of Hangars	9	8	17
Occupancy	95%	95%	95%
Average Monthly Rent [1]	180	250	213
Monthly Rental Revenue	1,620	2,000	3,407
Available for Loan Pmt [2]	1,458	1,800	3,066
Project Funding Summary			
Total Project Cost	427,000	342,000	646,000
Average Cost/Hangar	47,444	42,750	38,000
Funding Source:			
FAA/State Grants	140,881	46,985	87,696
Local Share			
Supportable Loan [3]	180,000	225,000	380,000
Unfunded Balance	106,119	70,015	178,304
Total Project Cost	427,000	342,000	646,000

[1] Calculation of average rent:	*Phase 1*	*Phase 2*	*Phase 3*
Hangars by Type			
T Hangars	*9*		*9*
Rectangular Hangars		*8*	*8*
Total	*9*	*8*	*17*
Monthly Rent by Type			
T Hangars	*180*	*180*	*180*
Rectangular Hangars	*250*	*250*	*250*
Average	*180*	*250*	*213*

[2] Assumes 90% of monthly rent revenue.
[3] Assumes 15 year loan with an annual percentage rate of 5.05% (the current Caltrans CAAP loan terms).

Table E-2
Calculation of Hangar Rent Required To Support Loan for Full Local Share of Hangar Development Cost
(all costs in constant 2003 dollars)

	Phase 1	Phase 2	Phase 3
Hangar Revenue Calculation			
Number of Hangars	9	8	17
Occupancy	95%	95%	95%
Average Monthly Rent [1]	280	325	306
Monthly Rental Revenue	2,520	2,600	4,899
Available for Loan Pmt [2]	2,268	2,340	4,409
Project Funding Summary			
Total Project Cost	427,000	342,000	646,000
Average Cost/Hangar	47,444	42,750	38,000
Funding Source:			
FAA/State Grants	140,881	46,985	87,696
Local Share			
Supportable Loan [3]	286,000	295,000	558,000
Unfunded Balance	119	15	304
Total Project Cost	427,000	342,000	646,000

[1] Calculation of average rent:	*Phase 1*	*Phase 2*	*Phase 3*
Hangars by Type			
T Hangars	*9*		*9*
Rectangular Hangars		*8*	*8*
Total	*9*	*8*	*17*
Monthly Rent by Type			
T Hangars	*280*		*285*
Rectangular Hangars		*325*	*330*
Average	*280*	*325*	*306*

[2] Assumes 90% of monthly rent revenue.
[3] Assumes 15 year loan with an annual percentage rate of 5.05% (the current Caltrans CAAP loan terms).

Prepared by

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999 Town & Country Road
Orange, California 92868