



Chapter Four

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**AIRPORT DEVELOPMENT  
ALTERNATIVES**

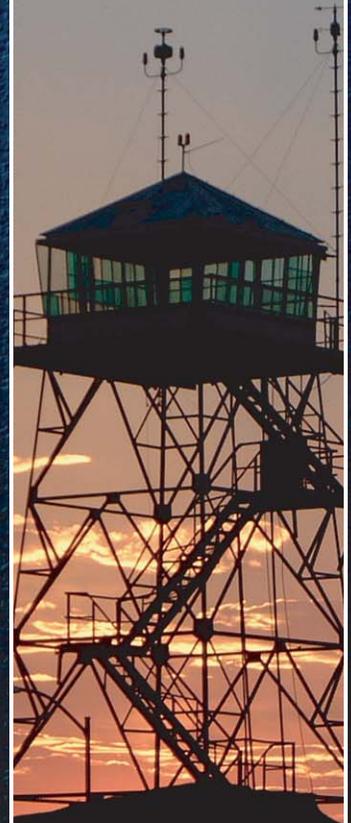
# AIRPORT DEVELOPMENT ALTERNATIVES

Prior to defining the development program for Kingman Airport, it is important to consider development potential and constraints at the airport. The purpose of this chapter is to consider the actual physical facilities which are needed to accommodate projected demand and meet the program requirements as defined in Chapter Three, Aviation Facility Requirements.

In this chapter, a series of airport development scenarios are considered for the airport. In each of these scenarios, different physical facility layouts are presented for the purposes of evaluation. The ultimate goal is to develop the underlying rationale which supports the final Master Plan recommendations. Through this process, an evaluation of the highest and best uses of airport property is made while considering local goals, physical constraints, and appropriate federal airport design standards, where appropriate.

Any development proposed by a Master Plan evolves from an analysis of projected needs. Though the needs were determined by the best methodology available, it cannot be assumed that future events will not change these needs. The master planning process attempts to develop a viable concept for meeting the needs caused by projected demands through the planning period.

The alternatives presented in this chapter have been developed to meet the overall program objectives for the airport in a balanced manner. Through coordination with the Planning Advisory Committee (PAC),



the public, and the Kingman Airport Authority (KAA), the alternatives (or combination thereof) will be refined and modified as necessary to develop the recommended development program. Therefore, the alternatives presented in this chapter can be considered a beginning point in the development of the recommended Master Plan development program, and input will be necessary to define the resultant development program.

## ***NON-DEVELOPMENT ALTERNATIVES***

Non-development alternatives include the no action or "do nothing" alternative, transferring service to an existing airport, or developing an airport at a new location.

### **NO ACTION ALTERNATIVE**

The no action or "do-nothing" alternative essentially considers keeping the airport in its present condition and not providing for any type of improvement to the existing facilities. The primary result of this alternative would be the inability of the airport to satisfy the projected aviation demands of the airport service area.

Kingman Airport and the adjacent industrial park are an important contributor to the economic development of the regional area. The airport is a transportation link to other regional and national economic centers. Not

improving Kingman Airport to meet its commercial and general aviation needs could limit economic growth for the region.

Kingman Airport is a federally designated essential air service market. This allows the air carrier serving the airport to receive an operating subsidy from the federal government in return for guarantees for scheduled service. This is done to ensure the community maintains the important transportation link noted above. Not maintaining the airfield in good working order and improving the safety of the airfield or operations would not be consistent with this federal program or community economic goals.

The general aviation industry has experienced an extended period of adjustment over the last 20 years, but it is now seen as a growth industry once more. While overall, general aviation growth will be slow, the demand for higher performance aircraft is experiencing the strongest rate of growth. With heightened interest in security due to the recent terrorist attacks in the United States, corporate general aviation could expect demand for private executive aircraft to grow even more. Although some restrictions (i.e., Transportation Security Administration [TSA] rulemaking) may work to counter-balance some of this growth, Kingman Airport's role as a strategically located airport requires that it be in a position to respond to anticipated demands for improved facilities for the reasons stated above.

## **SERVICE FROM ANOTHER EXISTING AIRPORT**

Service from another existing airport essentially considers relying on other airports to serve aviation demand for the local area. As detailed in Chapter One, there are only three public use airports within 40 nautical miles of Kingman Airport: Laughlin/Bullhead International Airport, Sun Valley Airport, and Eagle Airpark. Only Laughlin/Bullhead International Airport provides similar aviation capabilities to Kingman Airport. Therefore, while Laughlin/Bullhead International Airport could reasonably be expected to serve the aviation users of Kingman Airport, Laughlin/Bullhead International Airport is located nearly 40 miles west and would not be in a good position to serve the City of Kingman and regional area. Laughlin/Bullhead International Airport is also not considered an essential air service market. This would mean a loss in air service guarantees for the community.

Sun Valley Airport and Eagle Airpark have shorter runways and lower pavement strengths than Kingman Airport. Neither of these airports is capable of serving commercial airline service. Considering the current capability of these regional airports, none of these airports is presently configured to provide the level of service provided at Kingman Airport, without significant investments.

## **CONSTRUCTING A NEW AIRPORT**

Theoretically, another option to be considered is constructing a new airport. This is usually considered when the airport site is constrained by environmental or physical factors. However, Kingman Airport currently encompasses nearly 3,000 acres. The Kingman Airport Industrial Park encompasses nearly 1,000 acres.

From the social, political, and environmental standpoints, the commitment of a new large land area to replace Kingman Airport must also be considered. The development of a new airport similar to Kingman Airport would likely take 10 to 15 years to become a reality. The potential exists for significant environmental impacts associated with disturbing a large land area when developing a new airport site. To develop a new site with the capabilities of Kingman Airport could easily cost over \$50 million and would not provide the strategic location that the Kingman Airport does today to the City of Kingman. Furthermore, the Kingman Airport is an integral component and supporting facility for the adjacent Kingman Airport Industrial Park. Replacing the airport could reduce the marketability of this important economic contributor to the local economy and the ability of the industrial park to grow.

Overall, transferring service to an existing airport in the region or to an entirely new facility are unreasonable alternatives that should not be pursued further at this time. Kingman Airport is a valuable asset to the economic dynamics of the regional area. It should be developed to the extent practicable to maintain and promote commerce in the area.

## ***AIRPORT DEVELOPMENT OBJECTIVES***

It is the overall objective of this effort to produce a balanced airside and landside complex to serve forecast aviation demands. However, before defining and evaluating specific alternatives, the development objectives of this Master Plan should be considered. The primary goal for the Master Plan is to define a development concept which allows for the airport to be marketed, developed, and safely operated for the betterment of the community and its users. With this in mind, the following development objectives have been defined for this planning effort:

1. Develop a safe, attractive, and efficient aviation facility in accordance with applicable federal, state, and local regulations.
2. Identify facilities to efficiently and securely accommodate commercial airline activity.
3. Identify facilities to efficiently serve general aviation users.

4. Identify the necessary improvements that will provide sufficient airside and landside capacity to accommodate the long term planning horizon level of demand of the area.
5. Target local economic development through the development of available property and support of the adjacent Kingman Airport Industrial Park, including identifying a potential expansion of the industrial park to the south and east.
6. Maintain and operate the airport in compliance with applicable environmental regulations, standards, and guidelines.

The remainder of this chapter will describe various development alternatives for the airside and landside facilities. Within each of these components, specific facilities are required or desired. Although each component is treated separately, the final plan will integrate the individual requirements so that they complement one another.

## ***AIRFIELD ALTERNATIVES***

Airfield facilities are, by nature, the focal point of the airport complex. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs are often the most critical factor in the determination of viable airport

development alternatives. In particular, the runway system requires the greatest commitment of land area and often imparts the greatest influence of the identification and development of other airport facilities. Furthermore, aircraft operations dictate the FAA design criteria that must be considered when looking at airfield improvements. These criteria, depending upon the areas around the airport, can often have a significant impact on the viability of various alternatives designed to meet airfield needs.

The issues to be considered in this analysis are summarized on **Exhibit 4A**. The issues are summarized by functional use categories, which include: airfield and landside uses. These issues are the result of the findings of the Aviation Demand Forecasts and Aviation Facility Requirements evaluations, and include input from the PAC and KAA.

Kingman Airport serves each component of the air transportation industry: air carrier, air cargo, general aviation, and military. This requires accommodating a wide range of aircraft, from small single-engine aircraft used for recreational purposes to commercial airline and air cargo turboprops and some business jets. The airport also accommodates large transport aircraft which are stored and maintained at the airport.

Due to the airport's elevation and summertime temperatures, some of the operations of the larger aircraft are limited. The facility requirements analysis indicated a need for up to 7,000 feet of length on Runway 3-21 to

serve business aircraft. To ensure that the airport can take advantage of future growth opportunities that may require a longer runway, the Master Plan is considering the potential to provide up to 10,000 feet of length on Runway 3-21.

Improved instrument approach capability is also a need for Kingman Airport, which serves scheduled airline and air cargo activities. The capabilities of the existing instrument approaches at the airport are limited. These most capable approaches (Global Positioning System [GPS] Runway 21 approach and VOR/DME Runway 21 approach) only provide for landings when cloud ceilings are higher than 400 feet above the ground and visibility is greater than one mile for aircraft with approach speeds less than 140 knots. For aircraft with higher approach speeds, visibility minimums are increased by one-quarter mile.

Chapter Three identified that Runway 21 should ultimately have a Category (CAT) I precision approach. A precision instrument approach would increase the amount of time that the airport is accessible as landings could be made when the cloud ceilings are as low as 200 feet above the ground and visibility is restricted to one-half mile. This increases the reliability of the airport, which aids in improving and maintaining commercial airline and air cargo services that need to maintain a schedule regardless of weather conditions. Business and corporate users also desire this type of capability for their travel planning.

The precision approach could be developed with the standard instrument landing system (ILS) equipment or GPS once the Wide Area Augmentation System (WAAS) is fully CAT I capable after 2015. Achieving lower approach minimums will require the installation of an approach lighting system, such as the medium intensity approach lighting system with runway alignment indicator lights (MALSR), precision runway markings, and a larger runway protection zone (RPZ). Straight-in GPS approaches with vertical navigation are planned for Runways 17 and 35.

New exit taxiways are considered for both Runway 3-21 and Runway 17-35 to reduce runway occupancy time after landing. While not needed for capacity, consideration is being given to providing taxiway access to the south and east portions of the airport. This would provide future airfield access from these areas of the airport. Identifying the location of these taxiways now will reserve the area needed for the taxiways and prevent that area from being developed for other reasons, which could cause a costly relocation at a later date.

A consolidation of the existing and future long term aircraft storage needs at the airport is depicted on the airfield alternatives. Presently, there are approximately 150 stored commercial airline aircraft at Kingman Airport located in several areas of the airport. This Master Plan anticipates needing as many as 175 storage positions. Stored aircraft include a range of turboprops and large transport aircraft. The large transport aircraft are stored along the closed runway and near

Kingman Airline Services. The turboprop aircraft are stored on the existing apron area. The turboprop aircraft currently utilize portions of the main apron area adjacent to future development parcels. Should these parcels be developed with a user requiring apron area, it may be desirable to relocate and consolidate the stored aircraft in a more remote area of the airport. The configuration that is depicted on the alternatives is in use at other airports with a large number of stored commercial aircraft. In this concept, long taxiways are developed parallel to each other. The aircraft are placed nose-to-tail along the taxiway. The configuration shown allows for as many as seven large transport category aircraft to be stored along the taxiway.

## **AIRFIELD ALTERNATIVE A**

Airfield Alternative A is presented on **Exhibit 4B**. This alternative extends Runway 3-21 3,169 feet southwest for an ultimate length of 10,000 feet. The extension would cross a major drainage channel on the south side of the airport.

The location and configuration of the MALSR and RPZ needed to accommodate a precision instrument approach to Runway 21 is shown on Airfield Alternative A. The acquisition of approximately 78 acres of land along the northeastern airport boundary is shown to accommodate the MALSR light standards and RPZ.

Two additional exit taxiways for Runway 3-21 are shown as means to re-

## AIRFIELD CONSIDERATIONS

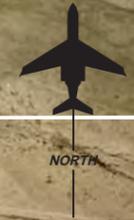
- Provide for Runway 3-21 to ultimately be 10,000 feet long
- Provide for additional exit taxiways on Runway 3-21 and Runway 17-35
- Relocate Taxiway A 400 feet from the Runway 3-21 centerline
- Provide for a taxiway access south of Runway 3-21
- Relocate Taxiway C 400 feet from the Runway 17-35 centerline
- Provide for a taxiway access east of Runway 17-35
- Provide for a precision instrument approach to Runway 21
- Provide for straight-in GPS approaches to Runways 17 and 35



## LANDSIDE CONSIDERATIONS

- Identify potential locations for taxiway access to the industrial park
- Identify potential locations for a helipad and helicopter parking positions on the main apron
- Identify potential locations for a new commercial airline passenger terminal building
- Identify potential locations for new hangar development to meet long term needs.
- Identify potential locations for the development of an aircraft wash rack and tenant maintenance shelter.
- Identify potential locations for a dedicated airport maintenance building.
- Identify potential locations for a new Airport Rescue and Firefighting (ARFF) building
- Identify locations for large aircraft storage
- Consider expansion of the Airport Industrial Park on the south and east portions of the airport



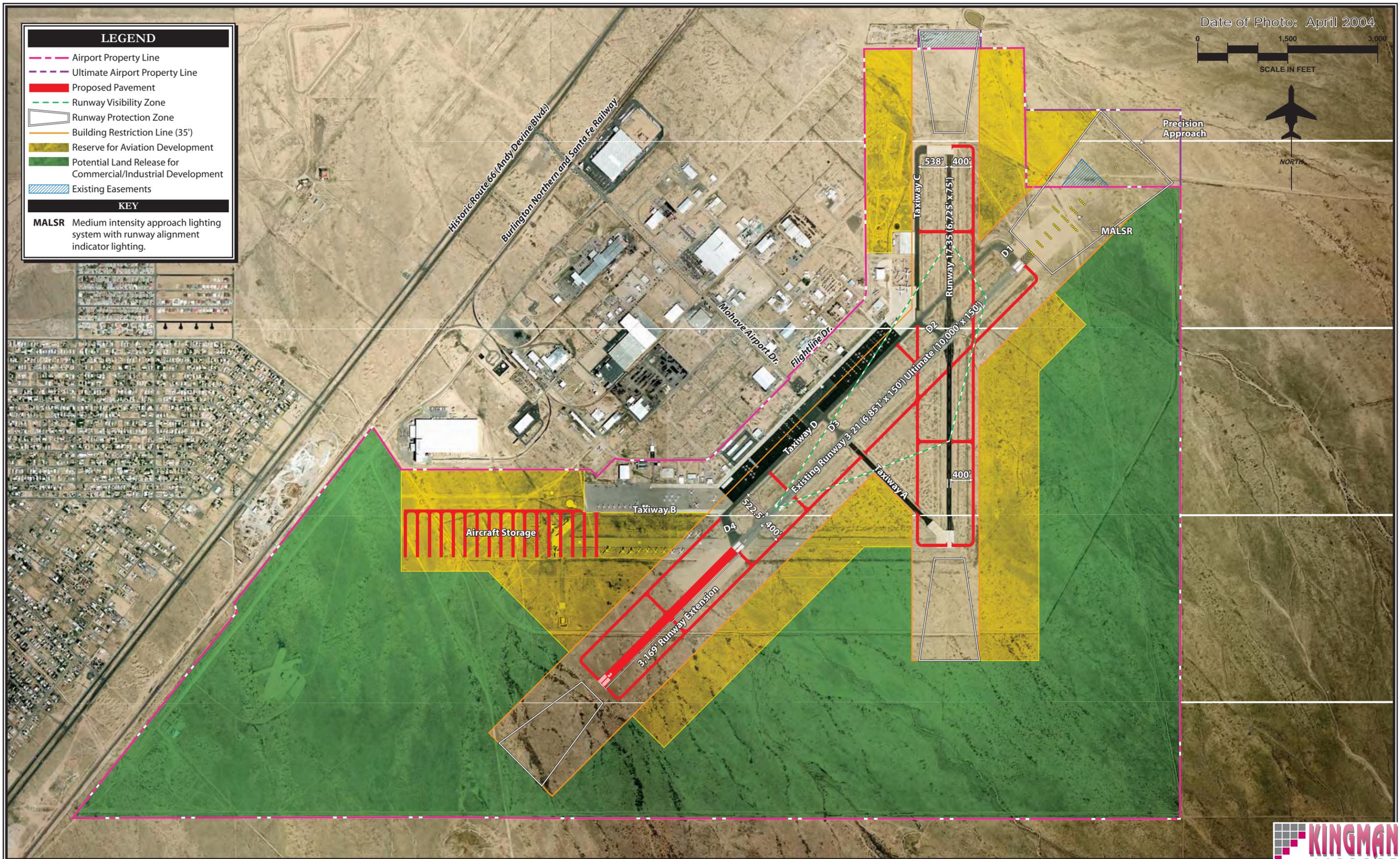


**LEGEND**

- Airport Property Line
- Ultimate Airport Property Line
- Proposed Pavement
- Runway Visibility Zone
- Runway Protection Zone
- Building Restriction Line (35')
- Reserve for Aviation Development
- Potential Land Release for Commercial/Industrial Development
- Existing Easements

**KEY**

**MALS** Medium intensity approach lighting system with runway alignment indicator lighting.



duce runway occupancy time. The first taxiway is planned between Taxiway D3 and Taxiway D4. This taxiway is located approximately 1,400 feet northeast of the existing Runway 3 threshold and 5,500 feet southwest of the Runway 21 threshold. This taxiway is expected to allow 92 percent of aircraft over 12,500 pounds landing Runway 21 to exit before reaching the Runway 3 end. The second exit taxiway is planned approximately 2,500 feet southwest of the Runway 21 end and approximately 4,400 feet northeast of the Runway 3 end. This taxiway will allow 100 percent of single engine aircraft landing Runway 21 to exit before reaching Taxiway D3 and 50 percent of aircraft over 12,500 pounds to exit before reaching the Runway 3 end.

Taxiway C is extended to the Runway 35 end in this alternative. This is an improvement shown in the previous Master Plan to provide direct access to the Runway 35 end. To access the Runway 35 end now, aircraft must use Taxiway D to Taxiway D3 and follow Taxiway A to the Runway 35 end. A full-length parallel taxiway also allows for the development of an exit taxiway between the Runway 35 end and the Runway 3-21/Runway 17-35 intersection. An exit taxiway is needed in this area at the airport as aircraft currently cannot exit until reaching the runway intersection and Taxiway D2. A new exit taxiway midway between the Runway 3-21/Runway 17-35 intersection and the Runway 17 end is also planned to allow more aircraft to exit the runway before reaching the runway end.

While extending Taxiway C to the Runway 35 end would provide a more direct route to this runway end, the ultimate need for direct taxiway access may be determined by the type of landside development north of the existing apron area. It is assumed that most aircraft located on the existing main apron area and along Taxiway B would continue to utilize the combination of Taxiways D, D3, and A to reach the Runway 35 end since a parallel taxiway would not serve these portions of the airport. Therefore, the parallel taxiway would be most beneficial for aircraft located along the existing length of Taxiway C which extends north of Runway 3-21. Considering that the area west of the existing portion of Taxiway C is a former landfill site, future development is limited and may never occur, perhaps limiting the need for a full-length parallel taxiway west of Runway 17-35.

Airfield Alternative A depicts a full-length parallel taxiway southeast of Runway 3-21 and east of Runway 17-35. These taxiways would serve future aviation development south and east of the existing runway system.

Airfield Alternative A proposes the long term aircraft storage area west of Taxiway B. This configuration provides for an extension of Taxiway B to the west with the aircraft storage taxilanes extending to the south. In this configuration, the storage taxilanes could be developed as needed for demand. These taxilanes do not necessarily need to be paved. Other airports with similar storage configurations use various soil stabilization

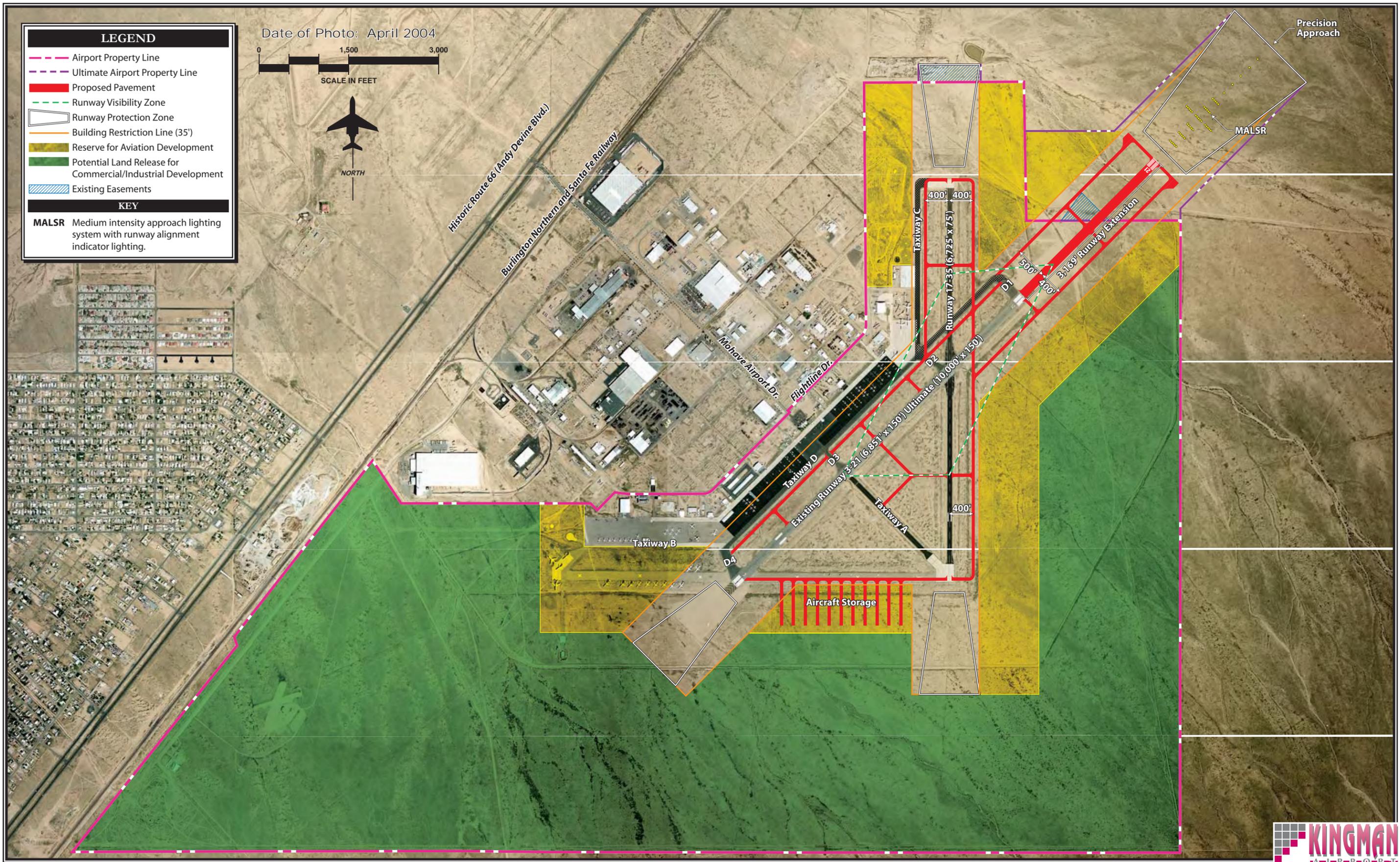
methods that do not require paving. Soil stabilization techniques were used in the past at Kingman Airport to create the existing large aircraft storage pads along the closed runway.

A final consideration is examining the ability to increase the size of the Kingman Airport Industrial Park. The existing industrial park has been developed quite successfully over the past several years. The industrial park has limited multi-acre parcels available for development. Therefore, the expansion of the industrial park may ultimately be warranted. The aviation needs of the region will not require the use of all the existing airport property to the south and east of the runway system. Furthermore, much of this land area is located too far from the runway to allow for airfield access. Therefore, the KAA may consider pursuing a release of this land from federal obligations for expansion of the industrial park in the same manner that the existing industrial park area was released from federal obligations in 1979. The industrial park provides an important economic contribution in terms of employment and tax revenues to the community. The area available for a future land release is illustrated in green shading on the exhibit. This is the area that would be available after reserving 1,500 feet on each side of Runway 3-21 and Runway 17-35 for aviation development. Up to 1,500 feet is typically needed from the runway centerline for apron, hangar, automobile parking, and access road development.

## **AIRFIELD ALTERNATIVE B**

Airfield Alternative B is shown on **Exhibit 4C**. In contrast with Airfield Alternative A, Runway 3-21 is extended 3,169 feet northeast for an ultimate length of 10,000 feet. The extension would cross the Frees Wash to the north, but would move the extension away from a planned residential community along the airport's southern border. The extension requires the acquisition of approximately 180 acres of land. A precision approach (with associated MALSR) is shown to the Runway 21 end to accommodate the extended MALSR lighting standards and precision RPZ.

Presently, Taxiway C and Taxiway D are located 538 feet and 522.5 feet from Runway 17-35 and Runway 3-21 centerlines, respectively. Federal Aviation Administration (FAA) design standards allow for the taxiways to be located as close as 400 feet from the runway centerline. This alternative relocates these taxiways to allow for increased apron area along Taxiway D and additional landside development along Taxiway C. An additional 20,000 square yards of apron is available by relocating Taxiway D. This additional apron is essentially the result of converting portions of existing Taxiway D to apron. Taxiway D currently extends along the eastern edge of the main apron area. An additional 13,800 square yards of area available for apron development is created along the relocated Taxiway C.



The proposed Runway 3-21 exit taxiway locations in this alternative are the same as in Airfield Alternative A. However, a full-length parallel taxiway southeast of Runway 3-21 is not retained in this alternative. The intent of the full-length parallel taxiway shown in Alternative A was to provide access from the southern portions of the airport to the Runway 17 and Runway 21 ends. However, this taxiway was somewhat redundant to the full-length parallel taxiway east of Runway 17-35 which already provided access to the northern runway ends. Therefore, this alternative creates a series of partial parallel taxiways and new taxiway extensions to allow aircraft from the south and east portions of the airport to access the Runway 17 and 21 ends without the need for a full-length parallel taxiway southeast of Runway 3-21.

In this alternative, a partial parallel taxiway is located southeast of Runway 3-21. This taxiway would extend from the existing closed runway to the Runway 3 end. The portion of the closed taxiway between Runway 3 and Runway 35 would be rebuilt and converted to taxiway. This taxiway would connect the south and east sides of the airport. A full-length parallel taxiway east of Runway 17-35 would provide access for the east side of the airport. A partial parallel taxiway to the Runway 21 end would extend between the Runway 17-35 east parallel taxiway and the Runway 21 end.

Converting the closed runway to a taxiway reduces some potential developable property on the airport. Airfield Alternative A had shown that aviation-related development could

extend into the area between Runway 17-35 and Runway 3-21 along Taxiway A. Converting the closed runway to taxiway would eliminate this possibility as the area north of the new taxiway would not have vehicle access.

An exit taxiway between the Runway 35 end and the Runway 3-21/Runway 17-35 intersection is an important improvement. This alternative provides for this taxiway to extend to the west and turn northwest to intersect Taxiway D. A connection to Taxiway A is also planned. This taxiway would allow aircraft to land Runway 35 and taxi directly to the main apron area.

The aircraft storage area is shown to be developed along the new taxiway developed on the closed runway alignment between the Runway 3 end and the Runway 35 end. Potential area for land release and ultimate aviation reserve are also shown on this alternative.

## ***LANDSIDE ALTERNATIVES***

The landside alternatives consider a number of facility needs related to commercial airline, general aviation, and support activities at the airport.

### **PASSENGER TERMINAL BUILDING**

A primary finding of this Master Plan is that a new commercial passenger terminal building is needed. This confirms previous planning recommendations which have also held that a new terminal building is needed. The cur-

rent building is 57 years old and may have reached the end of its useful life. The age, configuration, and construction of the building diminish its ability to be developed to serve long term commercial airline activities.

An airport passenger terminal is similar in many respects to other transportation terminals, but has some distinctly different characteristics. For example, the ground time of an aircraft is minimized; therefore, airport passenger terminals must be able to accommodate condensed peak passengers and baggage situations. In addition, airports place a greater reliance on the use of private automobiles for access to and from the airport, creating a need for adequate roadway and parking facilities.

A terminal building typically provides several separate and distinct functions. These include ticketing, airline office and baggage make-up, departure lounges, bag claim, and terminal services. Ticketing refers not only to airline ticket counters, but also to a ticket lobby for the queuing of passengers. Ticketing counters should be situated near the entrance, clearly visible, and readily accessible from the terminal curb. Airline office and baggage make-up refers to an area for airline personnel to complete administrative tasks, as well as collect outbound baggage. A separate baggage make-up location is important for baggage security, theft prevention, and sorting, and is usually situated directly behind the ticket counters.

The departure lounge or holdroom refers to an area where passengers wait to board an aircraft. Commonly, the

departure lounge is secure, separated from other public areas within the terminal. All passengers and carry-on luggage are screened prior to entry. At airports served by large air carrier aircraft, the departure lounge is located on a second level to provide for jet bridge loading. Kingman Airport uses ground level boarding. This is expected to continue as the airport is not expected to be served by large air carrier aircraft.

Baggage claim refers to the portion of the terminal used for the display of baggage to be claimed. The baggage claim lobby includes a bag claim counter and lobby for passengers awaiting baggage. Ideally, the bag claim lobby should be situated convenient to the arriving passenger flow and in proximity to the terminal curb.

Overall, an efficient terminal layout will provide adequate circulation space. The amount of circulation space varies, but at a minimum, circulation space should be provided in the ticketing and bag claim areas to minimize the disruptions of passenger queues at the ticketing and bag claim counters.

The current terminal building is undersized and does not provide all functional elements described above. There is neither a baggage claim area nor a secure departure lounge in the existing terminal building. The secure departure lounge is located in a trailer on the apron away from the terminal building. Passengers must walk outside uncovered to the trailer for security screening and holding prior to

boarding a flight. The ticket counter area is limited as well as the queuing area.

Compounding the current limitations, the current terminal building is not properly sized to serve future growth in enplanements. Given the age of the building, this plan considers developing a new terminal building which will provide sufficient area to accommodate the required functional elements described above.

The passenger terminal building is the first impression air travelers have of the community. A functional and attractive terminal facility is needed to secure and build air travelers' favorable opinion of a community, particularly business leaders who may be investing in the community.

New security methods and security equipment improvements may be needed over time at Kingman Airport. Current security equipment would not be able to be accommodated in the current terminal building, further solidifying the need for a new terminal building.

The *Aviation and Transportation Security Act* was written in response to the terrorist acts of September 11, 2001. Major provisions of the law applicable to terminal planning include the federal government taking responsibility of carry-on baggage screening and new requirements for checked baggage screening. The law required security screeners to be employees of the federal government by the end of 2002, and the establishment of a security manager at each airport. The law further requires that all

checked baggage be screened by explosive detection systems (EDS) by the end of 2002. Prior to the enactment of this law, the airlines were responsible for passenger and baggage screening.

Current checked baggage screening involves the use of EDS technology. EDS involves the use of computed tomography (CT) imaging technology. The FAA has certified two separate manufacturers' systems. To be effective, the EDS must be integrated with the baggage check-in and baggage make-up areas to efficiently direct checked baggage for screening. Presently, there is not an EDS system at the airport, nor is there is a baggage conveyor system at the airport. The current EDS imaging modules span as much as seven feet without conveyor systems and are as much as eight feet wide. An area for the operator workstation and maintenance must also be considered. The current terminal building does not provide sufficient area for this equipment should it be required in the future. The current Transportation Security Administration (TSA) administrative offices are located in a temporary facility south of the existing terminal due to the space limitations of the existing facility.

Electronic trace detection systems are also used in place of EDS modules at some airports. This could be an alternative to the full EDS system. Trace detection devices test for explosive residue on baggage and have been used at many locations where there is low traffic volumes or the EDS has not been installed. These machines

require less space within the terminal. Final decisions with regard to EDS will need to be coordinated with the TSA. The rules, regulations, costs, and procedures for these new requirements will need to be continually monitored.

### **Passenger Terminal Building Location Alternatives**

FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*, identifies a number of basic considerations that affect the location of a terminal building. The primary considerations include the following:

1. **Runway configuration:** The terminal should be located to minimize aircraft taxiing distances and times and the number of runway crossings.
2. **Access to transportation network:** The terminal should be located to provide the most direct/shortest routing to the regional roadway network.
3. **Expansion potential:** The long term viability of the terminal is dependent upon the ability of the site to accommodate expansion of the terminal beyond forecast requirements.
4. **FAA Geometric Design Standards:** The terminal location needs to assure adequate distance from present and future aircraft operational areas.

A review of each of these factors is listed below.

**Runway configuration:** The terminal is situated near the center of the main apron which is west of primary Runway 3-21. Taxiway D serves the main apron and located west of Runway 3-21. In this location, aircraft does not need to cross Runway 3-21 to access a runway end. The Runway 17 end can also be accessed without crossing an active runway.

**Access to transportation network:** The existing terminal building is located at the terminus of Mohave Airport Drive. Mohave Airport Drive connects directly with Andy Devine Boulevard (Historic Route 66) west of the terminal building. This intersection is signalized with dedicated turn lanes. Andy Devine Boulevard connects directly with Interstate Highway 40, and also extends directly to the City of Kingman central business district.

**Expansion potential:** There are only two permanent structures near the existing terminal – the KAA administration offices, located approximately 300 feet north and the historic airport traffic control located immediately adjacent to the terminal. The historic ATCT is an identifying feature of the airport and cannot be removed. This may limit some development potential to the south. However, sufficient area is available to the north for development. Additionally, considerable area is available between the terminal and Flightline Drive for parking and support facilities.

### **FAA Geometric Design Standards:**

The exiting terminal is located more than 1,000 feet west of the Runway 3-21 centerline. This is well outside any area obstruction clearance area and does not impact any design standards.

As shown, the existing terminal site meets the general recommendations of the FAA utilizing this criterion. Therefore, the terminal building should ultimately be redeveloped in its existing location. This also preserves the existing investments in the automobile parking and access already provided at the existing terminal building site.

Having established that the terminal should be located in the same general area, two potential development scenarios have been identified for the ultimate terminal location. The first option is shown on **Exhibit 4D**. In this option, the existing terminal is razed and replaced by the new terminal building. This locates the terminal at the center of the existing parking lot and replaces the aging building. However, this option requires the demolition of the existing building prior to constructing the new building. While terminal functions could be accommodated in a temporary structure, the continued operation of the restaurant would be more problematic. This option reserves all area to the north of the existing parking lot to the existing KAA administration building for public, employee, and rental car parking expansion and support functions such as rental car maintenance and storage. Additional support functional area is reserved south of the existing parking lot as well.

The second option is shown on **Exhibit 4E**. In this alternative, the new terminal is constructed immediately adjacent to the north side of the existing terminal building. This allows for the construction of the new building while allowing the continued operation of the new terminal including the restaurant. An advantage is that the existing terminal, and most importantly, the restaurant could be retained and integrated into the new terminal building. This would reduce development costs of the new terminal as the restaurant is retained. This option reserves all area to the north of the existing parking lot to the existing KAA administration building for public, employee, and rental car parking expansion. In this configuration, some support functions may need to be conducted off-site or in a more remote location of the airport.

### **General Aviation and Support Alternatives**

The primary planning considerations for this analysis is the development of additional general aviation storage hangars to accommodate forecast demand, identification of commercial general aviation parcels, the development of a helipad, and the development of a designated aircraft wash facility.

An airport maintenance facility and larger airport rescue and firefighting (ARFF) facility are also considered. There is currently no dedicated airport maintenance building. Some airport maintenance functions are accommodated in a T-hangar facility. The air-

port maintenance facility can be located off the main flightline as this activity does not require direct airfield access; although the facility should be located near a gated entrance point if not located within the fence line. If possible, the airport maintenance facility should be located in close proximity to the KAA administrative offices.

The existing KAA administration building provides a single bay for the storage of the single ARFF vehicle at the airport. A larger facility may ultimately be needed when new equipment is added at the airport. This may ultimately require a new facility to be constructed in the future.

Several factors must be considered when determining the best location for an ARFF facility. This not only includes the location and development costs of needed infrastructure items such as roads and utilities, but also includes ARFF operational response requirements. An ARFF facility location should allow for: 1) immediate, direct, and safe access to airside facilities; 2) unimpeded access routes with a minimum of turns to runways, taxiways, and aircraft parking aprons; 3) direct access to terminal aprons; 4) maximum surveillance of the air operations area; 5) shortest response time to the most probable aircraft accident areas; and 6) the minimum of obstructions or interferences from existing facilities such as access roads, fueling areas, and aircraft taxiing or parking areas. 14 CFR Part 139.319(i), *Aircraft Rescue and Firefighting: Operational Requirements*, requires that “within 3 minutes from the time of the alarm, at least one re-

quired aircraft rescue and firefighting vehicle shall reach the midpoint of the farthest runway serving air carrier aircraft from its assigned post, or reach any other specified point of comparable distance on the movement area that is available to air carriers, and begin application of extinguishing agent.”

The existing ARFF building is located near the center of the main apron. Direct access to the midpoint of Runway 3-21 is available via Taxiway D3. The midpoint of Runway 3-21 is approximately 1,500 feet from the current site. The midpoint of Runway 17-35 can be accessed via Taxiway D to Taxiway D2 or Taxiway D3 to Runway 3-21 to Runway 17-35. In both cases, the midpoint of Runway 17-35 is no more than 3,100 feet from the existing ARFF facility. Considering the availability of existing utility infrastructure and roadways, it does not appear that a new location is warranted, as it is not expected that a more suitable location could be found without limiting a future development parcel or increasing development costs. This alternatives analysis will consider a future ARFF facility remaining near its existing location.

The facility requirements analysis indicated the need for additional aircraft storage facilities. This could include the development of T-hangar units and clearspan hangars. Consideration will be given to providing areas for corporate/executive hangar development as well.

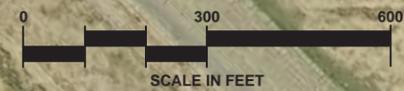
Consideration may be given to developing an aircraft wash facility to provide a suitable area for the washing of

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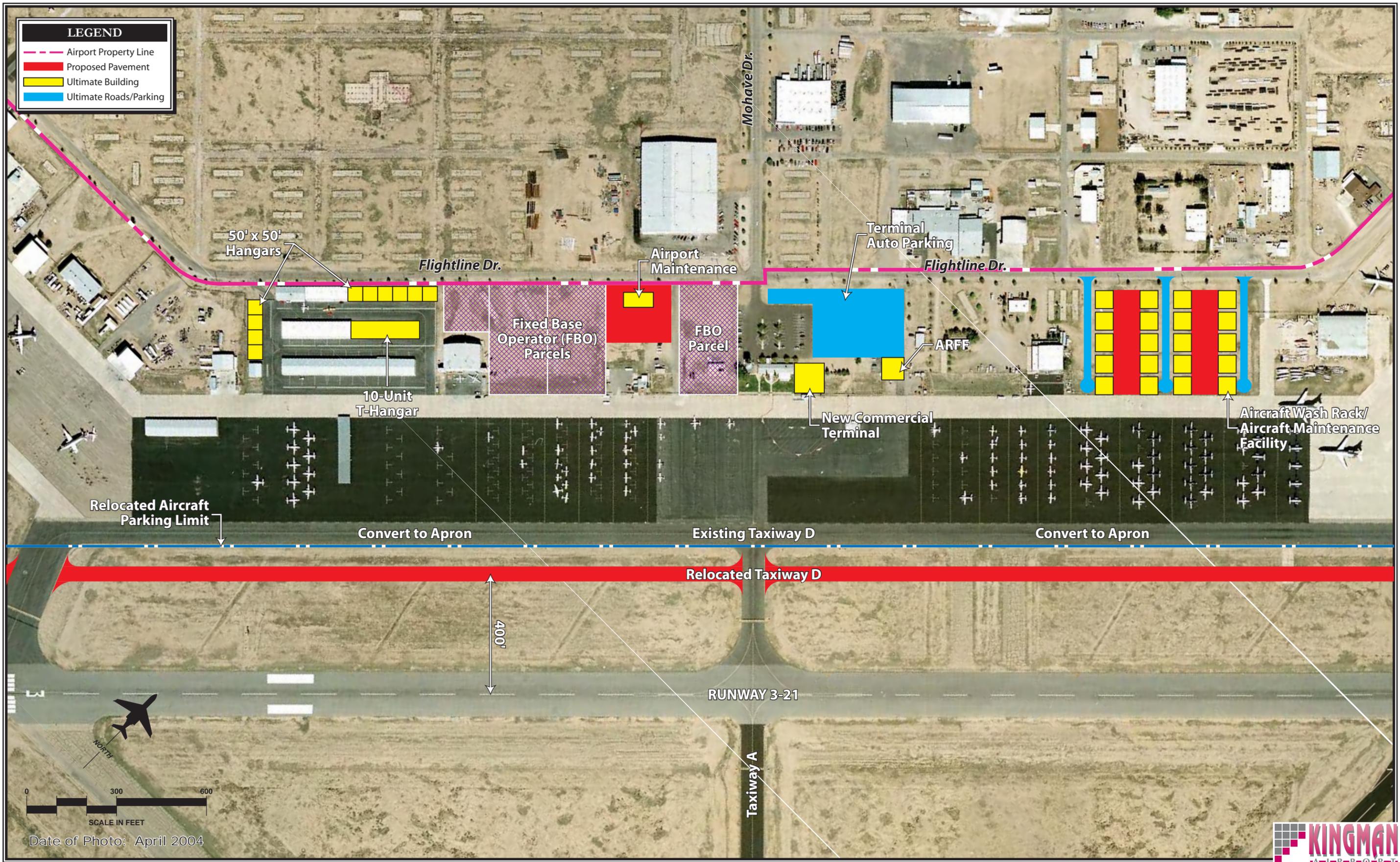
**LEGEND**

- - - Airport Property Line
- Proposed Pavement
- Ultimate Building
- Building to be Removed
- Ultimate Roads/Parking



Date of Photo: April 2004





Date of Photo: April 2004



aircraft. This provides for the proper disposal of aircraft cleaning fluids.

A helipad and helicopter parking area should also be considered. There is currently no designated helipad and helicopters must use apron areas for fixed-wing aircraft. Fixed-wing aircraft and rotary aircraft should be segregated to the extent practical. The best possible location for the helipad is along the main apron, just north of Taxiway D and south of the terminal building. This area is segregated from aircraft tiedown locations. This area currently accommodates most helicopter activity.

To a certain extent, landside uses should be grouped with similar uses or uses that are compatible. Other functions should be separated, or at least have well-defined boundaries for reasons of safety, security, and efficient operation. Finally, each landside use must be planned in conjunction with the airfield, as well as ground access that is suitable to the function.

Runway frontage should be reserved for those uses with a high level of airfield interface, or need for exposure. Other uses with lower levels of aircraft movements, or little need for runway exposure, can be placed in more isolated locations.

Typically, airports face development constraints of one degree or another because of their basic function, causing the alternatives analysis to focus upon specific layouts of landside facilities. However, only a portion of the available land area at Kingman Airport is presently developed.

Developable parcels are available along the west side of the main apron and along the southern apron and Taxiway B. The interrelationship of the landside functions discussed above is important to defining a long term landside layout for the airport. Therefore, these requirements have been combined in a series of development alternatives. Since the available area in the existing terminal area is expected to serve projected demand through the planning period, the analysis of development opportunities will be limited to this area. The area north of the Bureau of Land Management lease site along Taxiway C has not been considered for development as this area includes a former landfill site that would need to be mitigated prior to development. The ultimate land use plan will reserve this area for future aviation related development should the landfill be mitigated.

For clarity, the landside alternatives have been presented separately for the main apron area and the southwest apron area along Taxiway B.

### **Main Apron Alternative A**

Main Apron Alternative A is shown on **Exhibit 4D**. This alternative provides for the logical completion of the T-hangar area developed over the past few years. This includes expanding the center row of T-hangars by 10-units. An additional six 50-foot by 50-foot clearspan hangars can be developed along the western edge of this hangar area. An additional four 50-foot by 50-foot clearspan hangars can be developed along the southern edge

of this area. The wash rack is developed south of the aircraft storage area.

The area between Kingman Aero Services and Straube Aircraft Services is developed with two 10-unit T-hangars and 16 50-foot by 50-foot clearspan hangars. This closely resembles the existing aircraft storage hangar area described above. The airport maintenance facility is developed along Flightline Drive near the existing KAA administration building. The area between Kingman Airline Services and Air'zona Aircraft Services is reserved for Fixed Based Operator (FBO) development. FBOs provide a wide variety of general aviation services such as maintenance, charter, and flight training activities. FBOs generally require a large apron for circulation and tiedown and good visibility from the runway system. This location meets these needs. Much of the apron adjacent to these parcels is presently used for long term aircraft storage. The relocation of these aircraft may be required to fully utilize these parcels.

### **Main Apron Alternative B**

Main Apron Alternative B is shown on **Exhibit 4E**. Similar to Main Apron Alternative A, this alternative retains the completion of the existing aircraft storage area. In contrast with Main Apron Alternative A, two FBO parcels are proposed for the area between Kingman Aero Services and Straube Aircraft Services. The apron adjacent to these parcels is not presently dedicated to aircraft storage. Therefore, unlike Main Apron Alternative A, this

alternative would not require the relocation of stored aircraft.

A third FBO parcel is shown between the existing terminal parking lot and Kingman Aero Services. The primary disadvantage of providing for FBO development in this area is that it limits the passenger terminal building expansion to the south.

In this alternative, the area between Kingman Airline Services and Air'zona Aircraft Services is developed for a series of independent corporate/executive clearspan hangars. These hangars provide 6,400 square feet of space with adjacent automobile parking and access. A similar development is in place at Glendale Municipal Airport. A wash rack is developed along the main apron in lieu of one of the hangar positions.

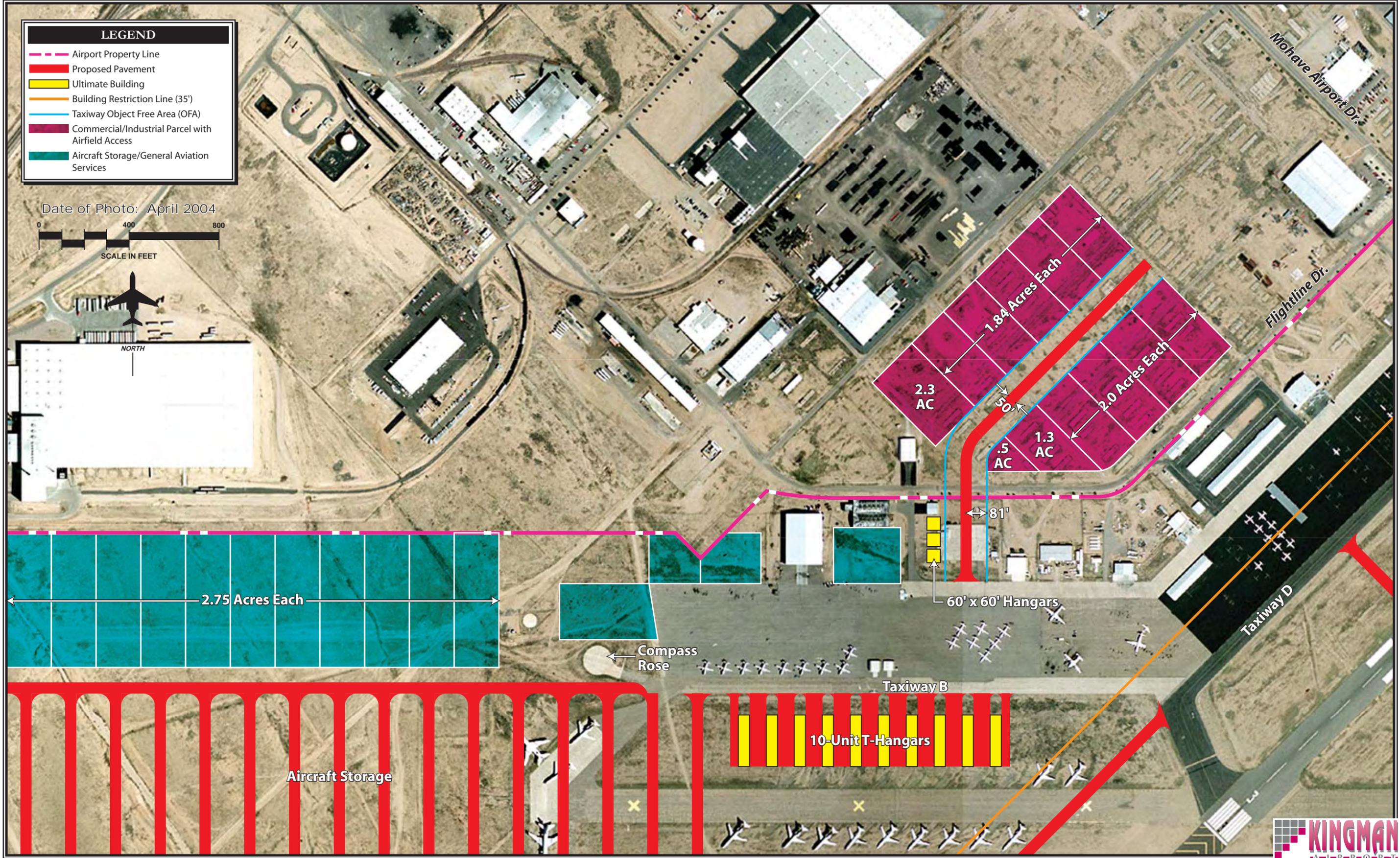
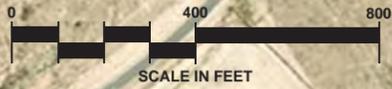
### **Southwest Alternative A**

Southwest Alternative A is shown on **Exhibit 4F**. This alternative extends taxiway access into the Kingman Airport Industrial Park across Flightline Drive utilizing an undeveloped parcel north of the Experimental Aircraft Association (EAA) hangar. This taxiway extends to 12 development parcels ranging from approximately 0.5 acres to 2.3 acres in size. Vehicle access to the southern parcels would be via Flightline Drive. Vehicle access to the northern parcels would be via an existing road in the industrial park. It is expected that Flightline Drive would be closed where the proposed taxiway crosses flightline drive. These parcels are designed to accommodate aircraft

**LEGEND**

- Airport Property Line
- Proposed Pavement
- Ultimate Building
- Building Restriction Line (35')
- Taxiway Object Free Area (OFA)
- Commercial/Industrial Parcel with Airfield Access
- Aircraft Storage/General Aviation Services

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through Airplane Design Group III (wingspans to 118 feet).

T-hangar development is proposed along the southern edge of Taxiway B. A total of 100 T-hangars are shown in this area. The development potential of this area greatly exceeds the projected long term need. Should this development option be pursued, further T-hangar development along the main apron area would not be needed. Therefore, all the undeveloped parcels along the main apron could be reserved for FBO development. A series of development parcels are shown along the apron and along the extended Taxiway B. Three clearspan hangars similar in size to the existing EAA hangar could be developed along the taxiway alignment in that area.

### **Southwest Alternative B**

Southwest Alternative A is shown on **Exhibit 4G**. Similar to Southwest Alternative A, taxiway access to the Kingman Airport Industrial Park is provided in this alternative. This alternative utilizes the existing taxiway located between the EAA hangar and Kingman Army Airfield (KAAF) Museum for airfield access. This location has an existing automated gate. This taxiway would provide access to 16 parcels ranging size from less than one acre to two acres. Vehicle access is from Flightline Drive and existing industrial park roads.

In contrast with Southwest Alternative A, the area north of the EAA hangar would be developed with a series of 9,600 square-foot hangars. Two 12-unit T-hangars would be developed in the area south of the KAAF museum. An additional 52 T-hangar units are

proposed on the west end of the apron. Similar to Southwest Alternative A, these proposed T-hangar developments exceed the projected need. Therefore, there would not be a need to develop further T-hangars along the main apron in excess of the logical completion of the existing aircraft storage area. A number of development parcels are reserved south of Taxiway B.

### ***SUMMARY***

The process utilized in assessing the airside and landside development alternatives involved a detailed analysis of short and long-term requirements, as well as future growth potential. Current airport design standards were considered at each stage of development.

Upon review of this report by the KAA, the public, and the PAC, a final Master Plan concept can be formed. The resultant plan will represent an airside facility that fulfills safety and design standards and a landside complex that can be developed as demand dictates.

The proposed development plan for the airport must represent a means by which the airport can grow in a balanced manner, both on the airside as well as the landside, to accommodate forecast demand. In addition, it must provide (as all good development plans should) for flexibility in the plan to meet activity growth beyond the 20-year planning period.

The remaining chapters will be dedicated to refining the basic concept into a final plan with recommendations to ensure proper implementation and timing for a demand-based program.

**LEGEND**

- Airport Property Line
- █ Proposed Pavement
- █ Ultimate Building
- █ Building Restriction Line (35')
- █ Taxiway Object Free Area (OFA)
- █ Commercial/Industrial Parcel with Airfield Access
- █ Aircraft Storage/General Aviation Services
- █ Potential Land Release for Commercial/Industrial Development

Date of Photo: April 2004

