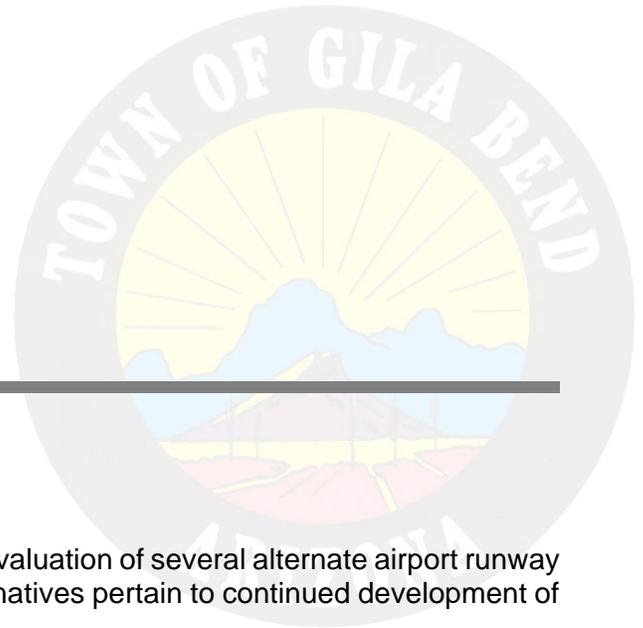


SECTION 4: DEVELOPMENT ALTERNATIVES

GILA BEND MUNICIPAL AIRPORT AIRPORT MASTER PLAN 2003



INTRODUCTION

This section contains a comparative evaluation of several alternate airport runway development configurations. All alternatives pertain to continued development of the existing airport site.

The Gila Bend Municipal Airport has an established runway and taxiway system that can accommodate, according to FAA criteria, all ARC B-II small aircraft that are 12,500 pounds or less. This is based on the present 5,200' runway design configuration that was examined in Section 2 (Forecasts of Aviation Activity - Critical Aircraft Determination). However, if it is demonstrated that a significant increase in larger and heavier B-II aircraft is imminent or occurring in the 20-year time frame of this study, consideration should be given to extending the runway to 6,500' and strengthening pavement to a 30,000 pound SWG profile.

In addition to the longer runway and increased design strength, accommodating the larger and faster aircraft would require that the taxiways and apron pavement also be strengthened accordingly.

The challenge in selecting an appropriate development plan will be to find an acceptable balance between airport utility, construction cost, and impacts to the surrounding area. In this case, the design and construction costs are the single most important governing factor in the selection of an alternative.

RUNWAY 4/22 DEVELOPMENT ALTERNATIVES

Three possible onsite development alternatives for a runway extension were developed. They are described below and are illustrated in **Figures 4-1** through **4-3** at the end of this section. The layouts analyzed were limited to those which would minimize the amount of land acquisition required for new development and would present the least potential for adverse impacts to the surrounding community and environment. All of the alternatives assume that an airport classification of ARC B-II will remain throughout the 20-year time frame of this study. All alternatives assume full extension of the parallel taxiway, as well as concurrent or

phased structural upgrade of the existing runway, taxiways and apron to a 30,000 pound SWG profile.

Alternative 1 (Figure 4-1):

This alternative is based on a future demonstrated need to extend the existing runway to 6,500', with a non-precision approach to not less than 3/4-statute mile visibility minimum. This phased project would extend the existing Runway 22 by 1,300' to the northeast with a pavement strength of 12,500 pounds, while retaining the existing width of 75'. Another phase would increase pavement strength of runway, taxiways, and apron to a 30,000 pound SWG profile by overlaying existing asphaltic pavements. The runway would require a 150' wide by 7,100' RSA and a 500' wide by 7,100' OFA. A 1,000' long by 500' by 700' RPZ and a 34:1 approach surface are required when heavier B-II aircraft are utilized.

This proposed extension to the northeast would require the fee acquisition and clearing of approximately 40 acres of land. Existing minor washes will need to be channeled under the runway and taxiway. Construction of this alternative would require some fill in wash areas.

In this alternative, the runway lighting (MIRL) and taxiway lighting (MITL) circuits will need to be extended 1,300' to accommodate the runway extension. Threshold lights, REIL's and PAPI's will be appropriately relocated. Some guidance signs will need to be modified or added and non-precision pavement markings are recommended for both ends of the runway. Perimeter fencing will be extended to encompass all newly acquired land, including RPZ of Runway 22.

Total estimated cost of development for Alternate 1 is approximately \$1,262,080 (See **Exhibit 1** at end of this Section).

Alternative 2 (Figure 4-2):

This alternative is also based on a future demonstrated need to extend the existing runway to 6,500', with a non-precision approach to not less than 3/4-statute mile visibility minimum. This phased project would extend the existing Runway 4 by 1,300' to the southwest with a pavement strength of 12,500 pounds, while retaining the existing width of 75'. Another phase would increase pavement strength of runway, taxiways, and apron to a 30,000 pound SWG profile by overlaying existing asphaltic pavements. The runway would require a 150' wide by 7,100' RSA and a 500' wide by 7,100' OFA. A 1,000' long by 500' by 700' RPZ and a 34:1 approach surface are required when heavier B-II aircraft are utilized.

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In this alternative, the runway lighting (MIRL) and taxiway lighting (MITL) circuits will need to be extended 1,300' to accommodate the runway extension. Threshold lights, REIL's and PAPI's will be appropriately relocated. Some guidance signs will need to be modified or added and non-precision pavement markings are recommended for both ends of the runway. Perimeter fencing will be extended to encompass all newly acquired land, including RPZ of Runway 4.

This proposed extension to the southwest would require a fee acquisition and clearing of approximately 26 acres of land. A significantly large wash will need to be channeled under the runway and taxiway, which will increase design and construction costs. Some environmental and habitat issues regarding the channelization of the wash may arise if this alternative is chosen. The extension of Runway 4 to the southwest results in an RPZ that comes within 20 feet of a dirt road adjacent to Southern Pacific Railroad tracks to the south. Development in this direction essentially wedges Runway 4 and its RPZ in between State Highway 85 to the north and the Southern Pacific Railroad to the south. The design of this alternative is feasible, but not necessarily the safest in terms of aviation activities. Construction of this alternative would require some fill in wash areas.

Total estimated cost of development for Alternate 2 is approximately \$1,488,640 (See **Exhibit 2** at end of this Section).

Alternative 3 (Figure 4-3):

This alternative is also based on a future demonstrated need to extend the existing runway to 6,500', with a non-precision approach to not less than 3/4-statute mile visibility minimum. This phased project would extend the existing Runway 4/22 by 650' to the southwest and 650' to the northeast with a pavement strength of 12,500 pounds, while retaining the existing width of 75'. Another phase would increase pavement strength of the runway, taxiways, and apron to a 30,000 pound SWG profile by overlaying existing asphaltic pavements. The runway would require a 150' wide by 7,100' RSA and a 500' wide by 7,100' OFA. A 1,000' long by 500' by 700' RPZ and a 34:1 approach surface are required when heavier B-II aircraft are utilized.

In this alternative, the runway lighting (MIRL) and taxiway lighting (MITL) circuits will need to be extended 650' to the southwest and the northeast to accommodate the runway extension. Threshold lights, REIL's and PAPI's will be appropriately relocated. Some guidance signs will need to be modified or added and non-precision pavement markings are recommended for both ends of the runway. Perimeter fencing will be extended to encompass all newly acquired land, including the RPZ of Runway 4 and Runway 22.

This proposed extension to the southwest and to the northeast would require a fee acquisition and clearing of approximately 44 acres of land. The southwest extension would require approximately 15 acres and the northeast extension approximately 29 acres. A significantly large wash will need to be channeled under Runway 4 and adjacent taxiway, which will increase design and construction costs. Some environmental and habitat issues regarding the channelization of the wash may arise if this alternative is chosen. A minor wash will need to be channeled under Runway 22 and adjacent taxiway. Construction of this alternative would require some fill in wash areas.

Total estimated cost of development for Alternate 3 is approximately \$1,589,760 (See **Exhibit 3** at end of this Section).

EVALUATION OF ALTERNATIVES

The three alternatives for Runway 4/22 development were comparatively evaluated by considering their relative development costs based on land acquisition, wash mitigation and potential for impacts to the environment.

Development Costs

Planning level estimates were prepared to facilitate a comparison of the relative development costs of major improvements between the various alternatives. These estimates included a calculation of approximate volume of earthwork for the runway extensions, approximation of the amount of land required to be purchased in fee as well as estimates of the cost of pavement construction for the runway and taxiway extension, wash mitigation, runway and taxiway edge lighting, visual aids, approach lighting, and fencing. Structural upgrade of the entire runway, taxiway and connectors, as well as the apron to a 30,000 pound SWG pavement profile would follow in a phased project. Detailed estimates are presented in **Exhibit 1** through **3** at the end of this Section.

The acquisition of land and the mitigation of washes are critical governing factors in the analysis of development costs. Development costs related to the design and construction of the runway and taxiway extension, excluding land acquisition and wash mitigation, will vary slightly in each alternative. Therefore, the most important cost items to compare will be land acquisition and drainage.

Development costs as a whole were considered to be the most important determining factor in evaluating the feasibility of the alternatives, since the availability of funding will ultimately determine whether the proposed work will be accomplished. This is true regardless of the other factors considered.

Potential for Impacts to the Environment

The potential for impacts to the environment were evaluated by considering the following factors:

- I The amount of desert habitat that would be disturbed for airport development, which would vary depending on the alternate chosen.
- I The disruption or channelization of major washes. This would be a important governing factor if Alternate 2 or Alternate 3 are chosen. Alternate 1 avoids the disturbance of a major wash by developing to the northeast.

Recommended Development Alternative

As discussed, in this case the development costs as a who are considered to be the most important determining factor in choosing an alternative. An evaluation of planning level development costs in **Exhibits 1** through **3** indicate that Alternative 1 is the most feasible, least costly and therefore the recommended alternative for development. As expected, the major differences in development costs are land acquisition and drainage mitigation. The most significant costs are incurred when the runway is extended equally to the northeast and to the southwest, or extended through the major wash to the southwest.

The development cost of Alternate 1 is 15.2% less than Alternative 2 and 20.6% less than Alternative 3, when directly compared. One should be cautioned in the interpretation of the development costs in **Exhibits 1** through **3**, because they are planning level estimates with a an accuracy of $\pm 15\%$.

Planning Level Cost Estimates

Exhibits 1 through **3** contain detailed estimates of development costs for each of the three alternatives. These are planning level estimates that were prepared as follows:

- C Land acquisitions were approximated based on apparent and/or convenient property or fence lines, and per acre costs were approximated based on the cost of similar properties. The land acquisition will be based on the Arizona State Trust Lands purchasing process, in which property is auctioned. Therefore, land costs will vary depending on the outcome of auctioning process.

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- C Drainage mitigation costs were approximated based on estimated flow for each of the washes and the linear feet of channelization involved in the various alternatives.
- C The cost of runway and taxiway lighting, guidance signage, wiring for visual aids, pavement marking, runway extension pavement construction and structural upgrade of the existing runway, as well as parallel taxiway construction were based on estimated costs per linear foot of runway construction or taxiway construction. The asphaltic pavement was estimated per ton and base courses on a square yard basis. Pavement costs for Phase 1 were based on a 12,500 pound SWG profile and Phase 2 pavement overlay was based on a 30,000 pound SWG profile.
- C A lump sum was applied for the relocation of PAPI & REIL systems for each end of runway.
- C A 10% contingency was added to all construction costs.
- C Engineering services for design and construction administration were estimated as 18% of construction costs.